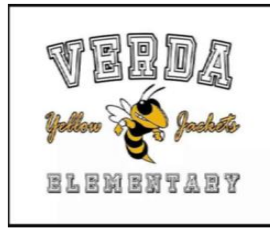


PROJECT MANUAL



**GRANT PARISH SCHOOL BOARD
VERDA ELEMENTARY SCHOOL – NEW ADMINISTRATIVE OFFICE
JOB NO. 25005 / CSW - RE-BID**

**2580 LA-122
MONTGOMERY, LA**

SCHOOL BOARD MEMBERS

Mason Briggs	President
Mike Slaughter	Vice President
April Brouillette	District 1
Lloyd Whitman	District 2
Karen Layton	District 3
Mason Briggs	District 4
Lisa Roberts	District 5
Mike Slaughter	District 6
Debbie McFarland	District 7
Bill Riggs	District 8
Erin Stokes, Ed.D	SUPERINTENDENT

Prepared by:

**BARRON HEINBERG & BROCATO, LLC
207 ANSLEY BLVD, 2nd FLOOR
SUITE D
ALEXANDRIA, LA 71303
318-443-7291**

January 7, 2026

SEALS PAGE

Verda Elementary School
New Administrative Office – Re-Bid
Montgomery, LA

ARCHITECTURAL SPECIFICATIONS

Responsible for Divisions or Sections noted below except where indicated
as prepared by other Design Professionals of Record

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DIVISION 01 – GENERAL REQUIREMENTS
DIVISION 02 – EXISTING CONDITIONS
DIVISION 03 - CONCRETE
DIVISION 04 – MASONRY
DIVISION 05 – METALS
DIVISION 06 – WOOD, PLASTICS AND COMPOSITES
DIVISION 07 – THERMAL AND MOISTURE PROTECTION
DIVISION 08 – OPENINGS
DIVISION 09 – FINISHES
DIVISION 10 – SPECIALTIES
DIVISION 11 - EQUIPMENT
DIVISION 12 – FURNISHINGS
DIVISION 31– EARTHWORK
DIVISION 32 – EXTERIOR IMPROVEMENTS
DIVISION 33 - UTILITIES



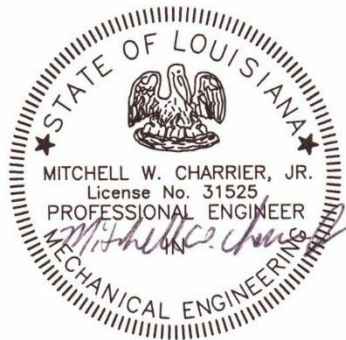
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SEAL PAGE

Verda Elementary School
New Administrative Office – Re-Bid
Montgomery, LA

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230620	AIR CONDITIONING, HEATING AND VENTILATION
230980	TESTING, ADJUSTING AND BALANCING



01/07/2026

Mechanical Engineer

SEALS PAGE

Verda Elementary School
New Administrative Office – Re-Bid
Montgomery, LA

ELECTRICAL SPECIFICATIONS

Responsible for Divisions or Sections noted below except were indicated
as prepared by other Design Professionals of Record

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SECTION 26 20 00 Interior Distribution System

SECTION 26 51 00 Interior Lighting

SECTION 26 56 00 Exterior Lighting

DIVISION 27 COMMUNICATIONS

SECTION 27 51 23 Intercommunication System

DIVISION 28 ELECTRONIC SAFETY AND SECURITY

SECTION 28 31 00 Interior Fire Detection and Alarm System

SEE INDIVIDUAL SPECIFICATIONS SECTIONS FOR PROFESSIONAL SEAL

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UNLESS OTHERWISE INDICATED IN THE CONTRACT DOCUMENTS,
WORK NORMALLY SPECIFIED IN THIS DIVISION IS NOT APPLICABLE.

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Advertisement for Bids

GRANT PARISH SCHOOL BOARD

VERDA ELEMENTARY SCHOOL – RE-BID NEW ADMINISTRATIVE OFFICE

Sealed bids will be accepted by the Grant Parish School Board at 512 Main Street, Colfax, LA 71417 until 2:00 P.M. CST on Thursday, January 29, 2026 at which time bids will be publicly opened and read aloud in the Board Room for the following public work:

Verda Elementary School New Administrative Office

Architect's Project Number: 25005/CSW-Re-Bid

Complete Bid Documents are available in electronic form only or may be obtained electronically from the following website: Bidexpress.com or Centralbidding.com. Printed copies are not available from the Designer or Owner, but arrangements can be made to obtain them through most reprographic firms. Complete bidding documents may be obtained on **Thumb Drive Only** from the Designer for a **non-refundable fee of \$ 30.00**. Bidders are responsible for all reproduction costs and/or fees associated with the use of the website. Only firms that are licensed under LA. R.S. 37:2150-2192 shall be eligible to obtain Bid Documents.

Questions about this procedure shall be directed to the Designer at Barron Heinberg & Brocato, LLC, 207 Ansley Blvd, 2nd Floor, Suite D, Alexandria, LA 71303. Attention: Michele Aymond, Email Address: michele@bhbach.com or via phone (318) 443-7291.

A MANDATORY PRE-BID CONFERENCE WILL BE HELD at 2:00 P.M. on Tuesday, January 14, 2026, at the Professional Development Center, 600 Main Street, Colfax, LA 71417. All Bidders interested in submitting a bid are required to attend.

Bids may be submitted either by registered or certified mail, hand delivery, or electronically at www.bidexpress.com. If submitted by mail or hand-delivery, bids shall be submitted to the following address:

Grant Parish School Board
Attn: Sealed Bid Enclosed
Title: Verda Elementary School New Administrative Office – Re-Bid
Street Address: 512 Main Street
Colfax, LA 71417

Bids mailed or hand-delivered shall be in a sealed opaque envelope with the notation “SEALED BID ENCLOSED”. The envelope shall be identified by: the Project Name and Number, the Bid Opening Date, the Bidder's name and address, and the Bidder's Louisiana Contractor's License Number. Bids shall be accepted only from Contractors who are licensed under LA. R.S. 37:2150-2192 for the classification of Building Construction. Bidder is solely responsible for proper delivery of its bid. Bids failing to comply with this paragraph or received after the aforementioned deadline date and time will be rejected

All bids shall be accompanied by bid security in an amount of five percent (5.0%) of the sum of the base bid and all alternates. The successful Bidder shall be required to furnish a Performance Bond and a Payment Bond. The form for these bonds shall be as stated in the Instructions to Bidders included in the Bid Documents for this Project.

This bid is let in accordance with the Louisiana Public Bid Law, La. R.S. 38:2212 et. seq. The provisions and requirements of the Public Bid Law and those stated in the Bid Documents shall not be waived. The Owner reserves the right to reject any and all bids for just cause. No bid may be withdrawn for a period of forty-five (45) days after receipt of bids, except under the provisions of LA. R.S. 38:2214. **Liquidated Damages shall be assessed at \$ 400.00 per day pursuant to the Contract Documents.**

GRANT PARISH SCHOOL BOARD
DR. ERIN STOKES, SUPERINTENDENT

Please Advertise:

Thursday, January 8, 2026
Thursday, January 15, 2026
Thursday, January 22, 2026

INSTRUCTIONS TO BIDDERS

1.0 General Information

1.1 Introduction

This Project is being bid pursuant to the Louisiana Public Bid Law, La. R.S. 38:2212, et seq. Accordingly, it shall be advertised and let by contract to the lowest responsible and responsive Bidder who bid according to the bidding documents as advertised, and no such public work shall be done except as provided for in La. R.S. 38:2212. The provisions and requirements of the Public Bid Law shall not be waived. To the extent the Louisiana Public Bid Law conflicts with these instructions, the advertisement, or any other Bidding Documents, the Public Bid Law shall control. Barring any conflict with the Public Bid Law, Bids must be made in accordance with the Advertisement for Bids, as required on the Bid Form, and as required in the Bid Documents as defined herein.

1.2 Definitions

All definitions set forth in the Owner's Modified AIA Document A201, General Conditions of the Contract for Construction are applicable to the Bid Documents. In addition, the following definitions are applicable to these instructions:

- a. Addenda means written and/or graphic instruments issued by the Architect prior to the opening of bids which modify or interpret the Bidding Documents by additions, deletions, clarifications, corrections and prior approvals.
- b. Alternate Bid (or Alternate) means an item on the bid form that may either increase (Additive Alternate) or decrease (Deductive Alternate) the quantity of work or change the type of work within the scope of the project, material, or equipment specified in the Bidding Documents, or both.
- c. Apparent Low Bidder means the lowest responsive and responsible Bidder at the time of bid opening. The Apparent Low Bidder, however, must comply with the requirements of Section 6.0 relative to the submission of post-bid information to remain responsive.
- d. Architect: Where the word "Architect" is used in any of the documents, it shall refer to the Licensed Design Professional for this Project, regardless of discipline. The Architect of record or his authorized representative, and the consulting engineer(s) whose seal(s) appear on the Construction Documents will administer the construction contract. The Owner does not warrant the sufficiency nor accuracy of the Architect's Bidding and Construction Documents.
- e. Base bid means the sum stated in the Bid for which the Bidder offers to perform the work described as the base, to which work may be added, or deleted for sums stated in alternate bids.
- f. Bid means a complete and properly signed proposal to do the work or designated portion thereof for the sums stipulated therein supported by data called for by the Bid Documents.
- g. Bidder means a properly licensed contractor who submits a bid for a prime Contract with the Owner for the work described in the Bid Documents. A properly licensed contractor is a person or entity who holds an active license with the Louisiana State Licensing Board of Contractors in the classification designated in the Advertisement.
- h. Bid Documents are written instruments prepared by or on behalf of Owner for use by Bidders for this Project. The Bidding Documents include the following:
 - 1. Advertisement for Bids
 - 2. Instructions to Bidders
 - 3. Louisiana Uniform Bid Form as promulgated in accordance with the Administrative Procedure Act by the division of administration, office of facility planning and control.
 - 4. Bid Bond
 - 5. Owner's Modified AIA Document A101, Contract Between Owner and Contractor (refer

- to specification section Administrative Group, 00-0101).
6. Owner's Modified AIA Document A201, General Conditions of the Contract for Construction (refer to specification section Administrative Group, 00-0201).
 7. 10-Day Attestations Pursuant to Title 38 Affidavit (refer to specification section Administrative Group, 00-0301).
 8. Performance Bond - (refer to specification section Administrative Group, 00-0401).
 9. Payment Bond - Refer to specification section Special Conditions (refer to specification section Administrative Group, 00-0401).
 11. Hazardous Material Certificate (refer to specification section Administrative Group, 00-0501).
 10. Specifications & Drawings
 11. Addenda issued during the bid period and acknowledged in the Bid Form
 12. Other Documents (if applicable).
- i. Licensed Design Professional means the architect, landscape architect, or engineer who shall have the primary responsibility for the total design services performed in connection with this Project. Such professional shall be licensed as appropriate and shall be registered under the laws of the state of Louisiana
 - j. Owner: The Owner of the proposed work is Grant Parish School Board, 512 Main Street, Colfax, LA 71417.
 - k. Probable construction costs means the estimate for the cost of the Project as designed that is determined by the Owner or the Architect.
 - l. Project Title and Number: The title of the Project Title and Number will be as indicated in the Advertisement for Bids. The Project Title and Number shall be included on the Bid Form and the Affidavit Pursuant to Louisiana Revised Statutes, Title 38, Chapter 10.
 - m. Responsible Bidder. As a public entity, the Owner is invested with discretionary powers to pass upon the honesty and integrity of a Bidder, qualities which are essential to the faithful performance of the contract. Subject to the provisions set forth in Section 5.3, an Owner may determine whether a Bidder is responsible by examining such things as experience, skill, ability, business judgment, financial capacity, integrity, honesty, possession of necessary facilities or equipment, previous performance, reputation, promptness and any other similar factors bearing on the Bidder's ability to successfully perform the contract.
 - n. Responsive Bidder means any Bidder who has fully complied with requirements of the Public Bid Law and/or the Bid Documents.
 - o. Sub-Bidder means a person or entity who submits a bid to a Bidder for materials and/or labor for a portion of the work.

2.0 Bid Documents

2.1 Obtaining Bid Documents

- a. Effective August 1, 2025, no proposal forms or specifications shall be issued to anyone except a licensed contractor who holds an active license or his authorized representation. La. R.S. 37:2165(B).
- b. Bidding Documents may be obtained from or examined at:
 1. The offices designated in the Advertisement for Bids;
 2. The office of the Architect; or
 3. If available, downloaded via bidexpress.com or centralbidding.com. If you are not currently a subscriber, you will need to apply for access.
- c. The Owner, through the Architect, shall furnish all prime Bidders who request bidding documents and who are properly licensed by the Louisiana State Licensing Board for Contractors with at least one set of complete Bidding Documents. As set forth in La. R.S. 38:2212(D), a deposit may be required and refunded. However, no deposits will be refunded on Bid Documents returned later than ten days after receipt of bids.
- d. If electronic distribution is available, printed copies will not be available, but arrangements may be made to obtain them through most reprographic firms and/or plan rooms. (All plan

- holders are responsible for their own reproduction costs. No reproduction costs will be refunded)
- e. The Owner or Architect in making copies of the Bidding Documents available on the above terms, do so only for the purpose of obtaining Bids on the work and do not confer a license or grant for any other use.
 - f. The Owner or Architect will maintain a list of all prospective Bidders for the purpose of addenda distribution. Copies of each addendum will be sent to all prospective Bidders known to have received a complete set of Bidding Documents by one of the following methods: (1) facsimile transmission; (2) e-mail; (3) electronically via Bidexpress.com or centralbidding.com, if available, or (3) hand-delivery.

2.2 Interpretation of Bid Documents

- a. A complete set of Bidding Documents shall be used in preparing Bids; neither the Owner nor the Architect assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.
- b. Bidders shall promptly notify the Architect of any discrepancy, ambiguity, inconsistency or error which they may discover upon examination of the Bidding Documents or of the site and local conditions. Failure to notify the Architect of any discrepancy, ambiguity, inconsistency, or error upon discovery of the item shall cause the Bidder to be bound by the interpretation of the Architect in regard to the discrepancy, ambiguity, inconsistency or error.
- c. Prospective Bidders desiring further information or interpretations of the Drawings and/or Specifications must request such data from the Architect in writing. To be given consideration, all requests must be RECEIVED at least seven (7) days prior to date fixed for the opening of bids.
- d. Any requirements or instructions in the Bid Documents that meet and exceed the statutory requirements the Public Bid Law shall not be interpreted as creating a conflict with the Public Bid Law.
- e. To the extent that any Bid Documents is interpreted to require the Bidder submit additional information other than that required by Public Bid Law at the time of Bid, that requirement shall be void. Notwithstanding the foregoing, the Apparent Low Bidder shall submit the additional information as set forth in section 6 of these Instructions.

2.3 Addendum

- a. No oral interpretations will be made as to the meaning of Bidding Documents. All questions, inquiries and requests for additional information by prospective Bidders, as well as any interpretation, correction or change of the Bidding Documents, will be made by Addendum. If necessary, Addendum will be issued in the form of modification to the Drawings and Specifications.
- b. No Addendum will be issued later than 72 hours prior to the date and time set for the receipt of Bids excluding Saturdays, Sundays and any legal holiday, except an addendum, if necessary, postponing the date of the receipt of the bids or withdrawing the request for Bids. If it is necessary to issue an Addendum within 72 hours prior to the date and time set for receipt of the Bids, then the Bid opening shall be extended for at least seven (7) days but not more than twenty-one (21) days without re-advertising or as otherwise provided by law. The Addendum shall state the revised time and date for the opening of bids.
- c. Except as provided in section 2.3(b) of these Instructions, Owner, may, through the issuance of an Addendum, extend the Bid period for up to thirty (30) days, without the requirement of readvertising.
- c. Interpretations, corrections or changes of the Bidding Documents made in any other manner other than as provided in this section 2.3 will not be binding, and Bidders shall not rely upon such interpretations, corrections and changes.
- d. Each Bidder shall ascertain from the Architect prior to submitting a Bid that he has received all Addenda issued and acknowledge all Addenda on its Bid Form. All Bids will be considered by the Owner provided the Bidder acknowledges receipt of all Addenda as specified on the

Bid Form. Failure to include acknowledgement of all Addenda on the Bid Form will cause the Bid to be rejected as non-responsive. Failure of a Bidder to consider one or more Addenda shall not relieve the Bidder from any obligation under his Bid as submitted.

2.4 Substitutions

- a. The materials, products and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution.
- b. The use of a name or trade name of a certain brand, make, or manufacturer in the contract documents, and / or the words "or equal" follow, it is the intent that the specification in the contract documents be used only to denote the quality standard of product desired and that they do not restrict Bidders to the specific brand, make, manufacturer, or specification named. Rather, it is the intent that the specification be used only to set forth and convey to prospective Bidders the general style, type, character, and quality of product desired. Equivalent products may be acceptable. The Architect shall determine whether a product is equivalent.
- e. A potential supplier may submit a written request for prior approval of a particular product, other than a product specified in the contract documents, no later than fourteen (14) working days prior to the opening of bids. Within ten (10) days, exclusively holidays and weekends, after submission, the Architect shall furnish to both the public entity and the potential supplier with written approval or denial of the product submitted. If the Architect approves any proposed substitution, such approval will be set forth in an addendum. Bidders shall not rely upon approvals made in any other manner. If the Architect fails to respond within the time period provided, the Bid date shall be extended at least seven (7) but not more than twenty-one (21) working days.
- f. Each such request for prior approval shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitute including model numbers, drawings, cuts, performance and test data and any other information necessary for an evaluation. A statement setting forth any changes in other materials, equipment or work that incorporation of the substitute would require shall be included. It shall be the responsibility of the proposer to include in his proposal all changes required of the Contract Documents if the proposed product is used. Prior approval is given contingent upon supplier being responsible for any costs which may be necessary to modify the space or facilities needed to accommodate the materials and equipment approved.

3.0 Pre-Bid Conference

3.1 Mandatory Pre-Bid Conference

- a. **A mandatory Pre-Bid Conference will be held at Professional Development Center, 600 Main Street, Colfax, LA 71417 on Tuesday, January 14, 2026 at 2:00 P.M.** The purpose of the mandatory Pre-Bid Conference is to familiarize interested Bidders with the requirements of the Project and the intent of the Contract Documents, and to receive comments and information from interested Bidders.
- b. Timely attendance at a mandatory Pre-bid conference is required in order to submit to a Bid. All prospective Bidders shall be present at the beginning of the pre-bid conference and shall remain in attendance for the duration of the conference. Any prospective Bidder who fails to attend the conference or remain for the duration shall be prohibited from submitting a Bid for the Project.
- c. Any revision of the Bidding Documents made as a result of the mandatory Pre-Bid Conference shall not be valid unless included in an Addendum.

4.0 BID PROCEDURE

4.1 Form and Style of Bid

- a. All Bids shall be submitted on the Louisiana Uniform Bid Form. If an electronic interactive system is used for submitting bids, the Louisiana Uniform Bid Form and all other statutorily required bidding documents. Bidder shall make no additional stipulations on the Bid Form nor qualify his bid in any other manner.
- b. Bid sums shall be expressed in both words and figures, and in case of discrepancy between the two, the written words shall govern.
- c. Bidders are cautioned to complete all unit prices should such be required in the Bid Form. Unit prices represent a price proposal to do a specified quantity and quality of work. Unit prices are incorporated into the Base Bid or Alternates, as indicated on the Unit Price Form, but are not the sole components thereof. If the Project requires unit price bids and there is a discrepancy between the Base Bid total and the sum of the extended unit prices, the unit price bid shall govern.
- c. All blanks on the Bid Form shall be filled in completely and accurately filled. If Bids are to be submitted on paper, the Bid Form shall be filled in by typewriter or manually in ink.
- d. Any timely change by a Bidder to his Bid prior to submission of the Bid shall be scratched through. The timely change, and any other interlineation, alteration or erasure on the submitted Bid Documents must be initialed by the signer of the Bid or his authorized representative. The change, as initialed, shall be binding.

4.2 Alternates

- a. Alternates, if accepted, shall be accepted in the order in which they are listed on the Bid Form. Determination of the low Bidder shall be on the basis of the sum of the base bid and any alternates accepted. However, the Owner reserves the right to accept alternates in any order which does not affect determination of the low Bidder.
- b. Bidders are cautioned to complete all alternates should such be required in the Bid Form. Failure to submit alternate prices will render the proposal informal and shall cause its rejection.

4.3 Signature

- a. The signature on Bid must be that of authorized representative of corporation, partnership, or other legal entity bidding. The Bidder must include above the authorized signatory's signature, the Bidder's State Contractor Licensing Number.
- b. Written evidence of the authority of the person signing the Bid shall be submitted with the Bid. The authority of the signature of the person submitting the Bid shall be deemed sufficient and acceptable if any of the following conditions are met:
 1. The signature on the Bid is that of any corporate officer listed on the most current annual report on file with the secretary of state, or the signature on the Bid is that of any member of a partnership, limited liability company, limited liability partnership, or other legal entity listed in the most current business records on file with the secretary of state.
 2. The signature on the Bid is that of an authorized representative as documented by the legal entity certifying the authority of the person.
 3. The legal entity has filed in the appropriate records of the secretary of state of this state, an affidavit, resolution, or other acknowledged or authentic document indicating the names of all parties authorized to submit bids for public contracts. Such document on file with the secretary of state shall remain in effect and shall be binding upon the principal until specifically rescinded and canceled from the records of the office.

4.4 Bid Security

- a. Bid security furnished by the Contractor shall guarantee that the Contractor will, if awarded the work according to the terms of his proposal, enter into the Contract and furnish

- Performance and Payment Bonds as required by these Bid Documents, within seven (7) calendar days of the receipt of the finalized Contract from Owner. No bid shall be considered or accepted unless the Bid is accompanied by bid security.
- b. A bid bond, a certified check, or cashier's check drawn on a bank insured by the Federal Deposit Insurance Corporation payable to the Grant Parish School Board in the amount equal to 5% of the base bid price with all additive alternates, must be submitted with the Bid Form. The surety must comply with the provisions of La. R.S. 38:2218(C).
 - c. If a bid bond is used, the bid bond shall:
 - 1. be written by a surety or insurance company currently on the U.S. Department of the Treasury Financial Management Service list of approved bonding companies which is published annually in the Federal Register, or by a Louisiana domiciled insurance company with at least an A- rating in the latest printing of the A.M. Best's Key Rating Guide to write individual bonds up to ten percent of policyholders' surplus as shown in the A.M. Best's Key Rating Guide or by an insurance company in good standing licensed to write bid bonds which is either domiciled in Louisiana or owned by Louisiana residents.
 - 2. be written in favor of Grant Parish School Board and include the legal name of Bidder;
 - 3. be signed by both the person or persons legally authorized to bind the Bidder to a contract and the Surety, accompanied by a Certificate of Power of Attorney showing that the party who executed the bonds is authorized to do so by the surety company. Failure by the Bidder/principal or the surety to sign the bid bond shall result in the rejection of the bid.
 - d. The Owner will have the right to retain the bid security of Bidders until either (a) the Contract has been executed and bonds have been furnished, or (b) the specified time has elapsed so that bids may be withdrawn, or (c) all bids have been rejected.
 - e. Should a Bidder refuse to enter into a Contract or fail to furnish Performance and Payment Bonds, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as penalty.

4.5 Bid Submission

- a. Each Bid shall be either: (1) hand delivered by the Bidder or his agent in which instance the deliverer shall be handed a written receipt, (2) sent by registered or certified mail with a return receipt requested, or (3) shall be submitted electronically as set forth in Section 4.5(g). Oral, telephonic, or facsimile transmitted bids will not be considered.
- b. Sealed Bids hand-delivered or sent by registered or certified mail shall be submitted to the address indicated on the Advertisement for Bids, prior to the time and date for submission indicated on the Advertisement for Bids, or any extension thereof made by addendum. Any Bid received after the time and date indicated shall be disqualified. For the purpose of Bids submitted electronically, the last timely Bid submission by each and any Bidder shall be binding. Bidders shall assume full responsibility for timely delivery at the location designated for receipt of Bids.
- d. The Bid Form and all documents required to accompany the Bid under the Public Bid Law shall be enclosed in a sealed opaque envelope. If the Bid is sent by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation "SEAL BID ENCLOSED" on the face of both envelopes. The envelope containing the Bid Form and the other statutorily required documents shall be addressed to the party receiving the Bids and shall be identified by: the Project Name and Number as shown on the Advertisement for Bids, the Bidder's name, address the Bidder's and Louisiana Contractor's License Number. Failure to show the Contractor's License Number on the envelope containing the Bid Form or the Bidder not being licensed in the license category stated in the Advertisement shall result in the Bid being automatically rejected and returned to the Bidder.
- e. The envelope shall not contain multiple bid forms.
- f. Owner shall not consider notations written on outside of Bid envelope to have the effect of amending the Bid.
- g. Electronic Bidding Option: Bidders may also submit bids electronically via bidexpress.com.

4.6 Bidder's Representations

Each Bidder by making his Bid represents that:

- a. He has read and understands the Bidding Documents and his Bid is made in accordance therewith.
- b. He has visited the site and has familiarized himself with the local conditions under which the work is to be performed. No compensation shall be allowed for items of cost due to the Bidder's lack of knowledge of existing conditions resulting in additional cost not included in the Bid.
- c. His Bid is based solely upon the materials, systems and equipment described in the Bidding Documents and as modified by addenda.
- d. His Bid is not based on any verbal instructions' contrary to the Contract Documents and addenda.
- e. He is satisfied as to (1) the conditions to be encountered, (2) the character, quality and scope of the proposed work, (3) the quality and quantity of the materials to be furnished, and (4) the requirements of the Bid, the plans and specifications, and other proposed Contract Documents.
- f. The Bidder certifies that by completing the Bid Form he is fully qualified and licensed in accordance with Louisiana Revised Statutes 37:2150, et seq., and applicable local licensing law(s) and holds a license in the classification stated in the Advertisement. He shall be responsible to determine that all sub-Bidders or prospective subcontractors are duly licensed in accordance with law.
- g. The Bidder, by submitting and signing the Bid Form, agrees and accepts the amount of time for completion of the Project as stated in the Advertisement for Bids and accepts the amount specified for liquidated damages as stated in the Advertisement for Bids.
- h. The Bidder is aware of the requirements of Louisiana Revised Statutes 38:2212.10 regarding an employee status verification system and 38:2225.1(B) for the preference to Louisiana residents.
- i. The Bidder understands and agrees that the Contract, if awarded to the Bidder, is for a stipulated sum and completion date. It is understood that the Owner has limited and a fixed amount of funds for the Project. The Owner does not expect changes in the contract sum nor in the Contract Time other than as allowed by the Contract Documents for Owner- initiated requests or unforeseen conditions. Responses by the Architect during construction shall not be considered changes affecting the Contract Sum or the Contract Time.
- j. The Bidder acknowledges and accepts the Owner's statement that the Owner does not warrant the completeness, sufficiency nor accuracy of the Architect's Bidding and Construction Documents.

5.0 CONSIDERATION OF BIDS

5.1 Opening of Bids

The properly identified Bids received on time will be opened publicly and will be read aloud, and a tabulation abstract of the amounts of the Base Bids and Alternates, if any, will be made available to Bidders. Determination of the low Bidder will be on the basis of the sum of the Base Bid and any alternates accepted.

5.2 Rejection of Bids

Owner shall have the right to reject any or all Bids for just cause, which may include but is not limited to:

- a. Owner's unavailability of funds sufficient for the construction of the proposed public work.
- b. The failure of any Bidder to submit a bid within an established threshold of the

- preconstruction estimates for that public work, as part of the bid specifications.
- c. A substantial change by the Owner's prior to the award in the scope or design of the proposed public work.
- d. A determination by the Owner not to build the proposed public work within twelve months of the date for the public opening and reading of bids.
- e. The disqualification by the Owner of any or all Bidders as non-responsive and/or non-responsible.

5.3 Responsible Bidder

If Owner proposes to disqualify any Bidder, either as a potential Bidder or as the low Bidder, on grounds that such Bidder is not a "responsible Bidder", the Owner shall give:

- (a) written notice of the proposed action to such Bidder and include in the written notice all reasons for the proposed action.
- (b) the Bidder who is proposed to be disqualified the opportunity to be heard at an informal hearing at which such Bidder is afforded the opportunity to refute the reasons for the proposed action.

The informal hearing shall be conducted prior to award of the public work and shall be a condition precedent to any action by the Bidder adverse to the Owner, its representatives, employees, and designers. The informal hearing shall be conducted by the Owner not later than five business days after the date of the notice of disqualification of such Bidder. The Owner shall issue a ruling in writing and deliver it to the affected Bidder not later than five business days after the date of the informal hearing. No award of the Contract for Project shall be made by the Owner prior to the expiration of at least five working days following the date of issuance of the decision by the hearing official.

6.0 POST-BID SUBMITTALS

6.1 Apparent Low Bidder 10-Day Post-Bid Submittals

Apart from the information statutorily required to be submitted with a Bid, a Bidder, other than the Apparent Low Bidder, shall not be required to furnish any other information or documentation any sooner than ten (10) days after the date bids are opened. Within ten (10) calendar days after the date of the opening of Bids, the Apparent Low Bidder shall submit the following additional documents:

- a. Affidavit Pursuant to Louisiana Revised Statutes, Title 38, Chapter 10. Affidavit Pursuant to Louisiana Revised Statutes, Title 38, Chapter 10, in the form attached and made part of the Bid Documents, provides the statutory attestations for the following:
 - Employees Verification System (La. R.S. 38:2212:10)
 - Contract Not Secured through Employment or Payment of Solicitor (La. R.S. 38:2224)
 - No Unpaid Workers Compensation Insurance (La. R.S. 38:2212.10)
 - Companies that Discriminate against Firearm and Ammunition Industries (La. R.S. 38:2216.1)
 - No Discrimination against Firearm and Ammunition Industries (La. R.S. 38:2216.1)
 - Criminal Convictions (La. R.S. 38:2227(C)(2) and La. R.S.38:2212.9(C))
- b. Roof System Guarantee. A letter/letters from the manufacturer stating that the manufacturer will issue the roof system guarantee complying with the requirements based on the specified roof system in the Contract Documents and include the name of the applicator acceptable to the manufacturer at the highest level of certification for installing the specified roof system. This manufacturer shall be one that has received prior approval or is named in the specifications.

Upon timely receipt of the above listed documents from the Apparent Low Bidder, the Owner shall announce the Apparent Low Bidder to be awarded the Contract.

6.2 Failure to Submit by Apparent Low Bidder

If the Apparent Low Bidder does not submit the proper information or documentation as required by the Bidding Documents within the ten-day period, such Bidder shall be declared non-responsive, and the Owner shall award the Bid to the next lowest Bidder, and afford the next lowest Bidder not less than ten days from the date the Apparent Low Bidder is declared non-responsive, to submit the proper information and documentation as required by the Bid Documents, and may continue such process until the Owner either determines the low Bidder or rejects all Bids.

7.0 WITHDRAWAL OF BID

7.1 Withdrawal Prior to Designated Date and Time of Bid Opening

Prior to the time and date designated for receipt of Bids, a submitted Bid Form may be modified or withdrawn. Withdrawn Bids may be re-submitted up to the date and time designated for the receipt of Bids.

7.2 Withdrawal After Designated Date and Time of Bid Opening

Except in accordance with La. R.S. 38:2214 which states, in part, "Bids containing patently obvious, unintentional, and substantial mechanical, clerical, or mathematical errors, or errors of unintentional omission of a substantial quantity of work, labor, material, or services made directly in the compilation of the bid, may be withdrawn by the contractor if clear and convincing sworn, written evidence of such errors is furnished to the public entity within forty- eight hours of the bid opening excluding Saturdays, Sundays, and legal holidays", a bid may not be modified, withdrawn or canceled by the Bidder for the period following the time and bid date designated for the receipt of bids, and Bidder so agrees in submitting his bid.

A Bidder who attempts to withdraw a bid under La. R.S. 38:2214 shall not be allowed to resubmit a bid on the Project. "If the bid withdrawn is the lowest bid, the next lowest bid may be accepted. If all bids are rejected no withdrawal of the bid which would result in the award of the contract on another bid of the same Bidder, his partner, or to a corporation or business venture owned by or in which he has an interest shall be permitted. No Bidder who is permitted to withdraw a bid shall supply any material or labor to, or perform any subcontract work agreement for, any person to whom a contract or subcontract is awarded in the performance of the contract for which the withdrawn bid was submitted".

7.3 Bid Security for Modifications

Bid Security shall be in an amount sufficient for the bid as modified or resubmitted.

8.0 NOTICE OF AWARD OF CONTRACT

8.1 Time Period for Holding Bids

The Notice of Award of a Contract will be announced after all of the required documents are submitted by the apparent low Bidder and the documents are accepted by the Owner. All bid security will be held until a Contract is signed by a Bidder and the Owner. Owner shall act not later than forty-five (45) calendar days after the date of opening bids to award the Project to the Apparent Low Bidder or to reject all Bids. During this period, Bids will remain valid and may not be modified, withdrawn or canceled by any Bidder except as allowed by law. The Owner and the Apparent Low Bidder, by mutual written consent, may agree to extend the deadline for award by one or more extensions of thirty (30) calendar days. The time period for holding Bids may also be extended as a result of an interested party or Bidder filing an injunction or writ of mandamus pursuant to La. R.S. 38:2215.

8.2 Notice of Award

Subject to the right of the Owner to reject all Bids and no injunction or temporary restraining

order is in effect, the Notice of Award to the Apparent Low Bidder whose Base Bid, plus any accepted alternates (if applicable), is within the project budget shall be announced after all Post Bid Submittals required in Section 6 are submitted. Under no circumstance may an awarded Bidder agree to relinquish or to compromise its award status in favor of another Bidder.

9.0 CONTRACT

9.1 Form of Contract

The form of Contract will be Owner's modified AIA Document A101, 2007 edition, Standard Form Stipulated Sum, an example of which is bound in the Bid Documents.

9.2 Execution of Contract

After the Contract is awarded, the finalized Contract will be prepared by the Owner and issued to the Contractor for execution. The Contractor shall submit the signed contract, together with the executed bonds and insurance certificates to the Owner, within seven (7) calendar days of the Contractor's receipt of the finalized Contract. The Owner and the Bidder awarded the Contract shall execute the Contract not later than sixty (60) calendar days after the date of the Notice of Award of the Contract to the Apparent Low Bidder.

9.3 Additional Documents

The Bidder shall return simultaneously with the executed Contract the Performance and the Payment Bonds as set forth in Section 9.5 and any additional documents specified in the Bidding Documents, including but not limited to insurance certificates.

9.4 Performance and Payment Bond

The Contractor shall furnish and pay for a Performance Bond and Payment Bond in an amount equal to 100% of the Contract amount in the form furnished with the Bid Documents. The Performance Bond and the Payment Bond shall be written by a company licensed to do business in Louisiana, which shall be signed by both the person or persons legally authorized to bind the Contractor to a Contract and the surety's agent or attorney in fact, accompanied by a Certificate of Power of Attorney showing that the party who executed the bonds is authorized to do so by the surety company. Surety must be listed currently on the U. S. Department of Treasury Financial Management Service List (Treasury List) as approved for an amount equal to or greater than the contract amount or must be an insurance company domiciled in Louisiana or owned by Louisiana residents. If surety is qualified other than by listing on the Treasury list, the contract amount may not exceed fifteen percent of policyholders' surplus as shown by surety's most recent financial statements filed with the Louisiana Department of Insurance and may not exceed the amount of \$500,000. However, a Louisiana domiciled insurance company with at least an A- rating in the latest printing of the A. M. Best's Key Rating Guide shall not be subject to the \$500,000 limitation, provided that the contract amount does not exceed ten percent of policyholders' surplus as shown in the latest A. M. Best's Key Rating Guide nor fifteen percent of policyholders' surplus as shown by surety's most recent financial statements filed with the Louisiana Department of Insurance. The Performance Bond and the Payment Bond be written in favor of Grant Parish School Board and include the legal name of Bidder.

9.5 Notice to Proceed

The Owner shall issue to the Contractor a notice to proceed with the Project not later than thirty calendar days following the date of execution of the Contract by both parties. The Owner and Contractor, upon mutual written consent of both parties, may agree to extend the deadline to issue the notice to proceed.

9.6 Completion of Work and Liquidated Damages

The completion of the work must be within the time stated in the Bidding Documents, subject to any extensions as may be granted in accordance with the Contract Documents or the Contractor

shall pay the Liquidated Damages in the amount as stated in the Advertisement for Bids for each consecutive calendar day of delay that the Project is not substantially completed. The Contract Time shall commence from the date as stated in the Agreement or in a Notice to Proceed with the Work at the Project site.

9.7 Sales Tax Exemption

The Project is to be exempt from sales and use taxes imposed by any taxing authority. The successful Contractor, and its subcontractors, will be required to submit the appropriate tax exemption form R-85012-T (Public Projects Contractor / Subcontractor: Sales Tax Certification and Exemption Application – Louisiana Revised Statute 47:305.7(A)(1)(b)) to the Louisiana Department of Revenue for each contract / subcontract associated with the work.

END OF INSTRUCTION

SUPPLEMENTARY CONDITIONS TO INSTRUCTIONS TO BIDDERS

The following supplements the "Instructions to Bidders", AIA Document A701, 2018 Edition. Where a portion of the Instructions to Bidders is modified or deleted by these Supplementary Conditions to Instructions to Bidders, the unaltered portions of the Instructions to Bidders shall remain in effect.

Article 1 - Definitions

Add 1.10

- 1.10 Written request or notification shall include transmission of original or photocopy of original document by public carrier or delivery in person. Facsimile or e-mail will not be considered written request or notification.

Article 2 – Bidder's Representations

Add 2.1.5, 2.1.6, 2.1.7

- 2.1.5 The bidder is fully qualified under any State or Local Licensing Law for Contractors in effect at the location of the Work before submitting his bid. For projects in the State of Louisiana, the Contractor and Sub-Contractors shall be licensed under Louisiana Revised Statutes 37:2151, et. Seq. And any other applicable statutes for projects requiring licensing in accordance with the law. The Contractor shall state his license number with his bid and be responsible for determining that all Sub-Contractors are appropriately licensed.
- 2.1.6 If an Affidavit is required by other portions of these bid documents, the Bidder has read same and is willing and able to execute the Affidavit.
- 2.1.7 The bid price includes the furnishing of all materials, products, tools, labor, scaffolding, transportation, and equipment necessary to do the Work in full conformity with the proposed Contract Documents.

Article 3 - Bidding Documents

Modify 3.1.1 as follows:

In the second sentence, after the word deposit, add, or portion thereof as designated in the Advertisement or Invitation to Bid.

Delete the third sentence and substitute therefore In the event the returned Bidding Documents are damaged or portions are missing to the extent that the documents are not reusable in the opinion of the Architect, the entire deposit will be forfeited by the Bidder.

In the second paragraph, after the word award, delete may retain the bidding documents and substitute therefore shall return the Bidding Documents for review. The same Bidding Documents will be returned to the bidder.

Delete Paragraphs 3.3.1 thru 3.3.4 and substitute therefore:

- 3.3.1 Materials, products and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance, and quality to be met and are not intended to exclude any material, product, or equipment of equal or greater quality, appearance or performance from the Work.
- 3.3.2 Any product or equipment shall be checked by the Contractor for compliance with

performance specified and expected of the product, material or equipment. Compatibility with adjacent products, material or equipment, construction, connection to mechanical, electrical services or any other variation from that specified are the total responsibility of the Contractor. The burden of proof of the merit of a product, material, or equipment lies totally with the Contractor.

3.3.3 The Architect will not issue prior approval of any material, product, or equipment.

3.3.4 Only those products, material, or equipment which in the opinion of the Architect met or exceed specified performance and requirements will be approved upon submittal of Shop Drawings and/or Product Data and substantiation data from the Contractor. By submission of Shop Drawings, Product Data and additional data for a product, material, or equipment, the Contractor warrants the product, material, or equipment meets or exceeds the performance or quality of that specified.

Delete Paragraph 3.4.2

Modify 3.4.3 as follows:

In the first sentence, delete the words four days and substitute therefore seventy- two hours.

In the first sentence, delete the word date in both instances, and substitute therefore date and time.

Add Paragraph 3.4.3.1 as follows:

3.4.3.1 All Addenda will be available for review to all persons who are known to have received complete sets of bidding documents, or to any other interested party, at the Architect's office no later than 72 hours prior to the date and time for receipt of bids.

Article 4 - Bidding Procedures

Modify 4.1.5 as follows:

After the paragraph, add an additional sentence as follows: If the alternate results in a change in the Proposed Contract Amount indicate whether the change is a add or a deduct in writing add or deduct or use of appropriate symbol (+) or (-).

Modify 4.1.7 as follows:

Delete the third sentence of this paragraph.

Delete the last sentence and substitute therefore: A bid submitted by an agent shall either have a current power of attorney attached certifying the agent's authority to bind the Bidder, or the bidder shall have filed in the appropriate records of the Secretary of State or the Clerk of Court of the parish in which the entity receiving bids is located, an affidavit, resolution, or other acknowledged or authentic document indicating the names of all parties authorized to submit bids for public contracts, and the agent's name is indicated in such document.

Article 4.2 - Bid Security

Modify 4.2.1 as follows:

In the first sentence, after the word required, delete the remainder of the sentence.

Delete the last sentence of the paragraph.
Add Paragraph 4.2.1.1

4.2.1.1 Bid security shall be equal to five percent (5%) of the Total Amount of the Proposal, including all Alternates in the form of a Certified Check, Cashier's Check or Bid Bond written by a company licensed to do business in Louisiana and which is named in the current list of ACompanies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies as published in Circular 570 (amended) by the Audit Staff, Bureau of Government Financial Operations, U.S. Treasury Department. The bond shall be countersigned by a person who is contracted with the Surety Company or bond issuer as an agent of the company or issuer, who is licensed as an insurance agent in the state in which the project is to be constructed, and who is residing in same state.

Modify 4.2.2 as follows:

Delete the words unless otherwise provided in the Bidding Documents@ and substitute therefore or other suitable form.

Article 4.3 - Submission of Bids

Modify 4.3.1 as follows:

Bids for each respective contract, together with bid security and any other required documents shall be delivered in a sealed envelope at the time and place stated in the Advertisement for Bids with information on the outside of the envelope as follows:

PROPOSAL FOR THE CONSTRUCTION OF (NAME OF JOB) FOR (OWNER'S NAME AND ADDRESS)

**CONTRACTOR'S NAME
CONTRACTOR'S ADDRESS
CONTRACTOR'S LOUISIANA LICENSE NUMBER**

If the bid is submitted by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation "SEALED BID ENCLOSED" on the face thereof.

The remainder of the paragraph to remain.

Modify 4.4.1 as follows:

Delete the words a stipulated time period and substitute therefore a period of thirty (30) calendar days. The remainder of the paragraph to remain.

Article 5 - Consideration of Bids.

Modify 5.1.1 as follows:

Delete from the first word of the sentence to the second comma. Capitalize the word the following the second comma. The word The becomes the first word of the paragraph.

Add paragraph 5.2.1.1

5.2.1.1 If a bid is to be rejected by the Owner, the procedures in the public bid law will be adhered to.

Modify 5.3.1 as follows:

After the first occurrence of the words Bidding Documents add the phrase And the public bid law,

After the words in the second sentence Bid received, add the phrase other than those which may not be waived in accordance with the public bid law.

Delete 5.3.2 and substitute therefore:

5.3.2 Alternates, if accepted, shall be accepted in the order in which they are listed on the bid form. Determination of the low bidder shall be on the basis of the sum of the base bid and any alternates accepted. The Owner reserves the right to accept the alternates in any order which does not affect determination of the low bidder.

Article 6 - Post-Bid Information.

Delete Article 6 in its entirety.

Article 7 - Performance Bond and Payment Bond

Modify 7.1.1 as follows:

Delete the entire second sentence of the paragraph.

Delete 7.1.2 in its entirety.

Delete 7.1.3 in its entirety.

Article 8 - Form of Agreement between Owner and Contractor

Delete Article 8 in its entirety.

END OF SUPPLEMENT TO INSTRUCTIONS TO BIDDERS

LOUISIANA UNIFORM PUBLIC WORK BID FORM

TO: Grant Parish School Board
512 Main Street
Colfax, LA 71417

RE-BID FOR: New Administrative Office Verda
Elementary School
2580 LA-122
Montgomery, LA

The undersigned bidder hereby declares and represents that she/he; a) has carefully examined and understands the Bidding Documents, b) has not received, relied on, or based his bid on any verbal instructions contrary to the Bidding Documents or any addenda, c) has personally inspected and is familiar with the project site, and hereby proposes to provide all labor, materials, tools, appliances and facilities as required to perform, in a workmanlike manner, all work and services for the construction and completion of the referenced project, all in strict accordance with the Bidding Documents prepared by: Barron Heinberg & Brocato, Architects and Engineers and dated: January 7, 2026.

Bidders must acknowledge all addenda. The Bidder acknowledges receipt of the following **ADDENDA:** (Enter the number the Designer has assigned to each of the addenda that the Bidder is acknowledging) _____ .

TOTAL BASE BID: For all work required for the **New Administrative Office for Verda Elementary School-Re-Bid**, by the Bidding Documents (including any and all unit prices designated "Base Bid" * but not alternates) the sum of:

_____ Dollars (\$ _____)

ALTERNATES: For any and all work required by the Bidding Documents for Alternates including any and all unit prices designated as alternates in the unit price description.

Additive Alternate No. 1: Add Covered Front Porch 100 as detailed for the lump sum of:

_____ Dollars (\$ _____)

Additive Alternate No. 2: Add two new automatic sliding vehicular gates and gate operators and associated fencing, concrete driveway apron, crushed stone driveway and electrical work for the lump sum of:

_____ Dollars (\$ _____)

Additive Alternate No. 3: Replace Intercom System as indicated on Electrical Drawings for the lump sum of:

_____ Dollars (\$ _____)

NAME OF BIDDER: _____

ADDRESS OF BIDDER: _____

LOUISIANA CONTRACTOR'S LICENSE NUMBER: _____

NAME OF AUTHORIZED SIGNATORY OF BIDDER: _____

TITLE OF AUTHORIZED SIGNATORY OF BIDDER: _____

SIGNATURE OF AUTHORIZED SIGNATORY OF BIDDER **: _____

DATE: _____

* The Unit Price Form shall be used if the contract includes unit prices. Otherwise it is not required and need not be included with the form. The number of unit prices that may be included is not limited and additional sheets may be included if needed.

** If someone other than a corporate officer signs for the Bidder/Contractor, a copy of a corporate resolution or other signature authorization shall be required for submission of bid. Failure to include a copy of the appropriate signature authorization, if required, may result in the rejection of the bid unless bidder has complied with La. R.S. 38:2212(A)(1)(c) or RS 38:2212(O) .

BID SECURITY in the form of a bid bond, certified check or cashier's check as prescribed by LA RS 38:2218.A is attached to and made a part of this bid.

BID BOND

FOR

VERDA ELEMENTARY SCHOOL NEW ADMINISTRATIVE OFFICE

Project Number: BHB: 25005/CSW

Date: _____

KNOW ALL MEN BY THESE PRESENTS:

That _____ of _____, as Principal, and _____, as Surety, are held and firmly bound unto the Grant Parish School Board (Obligee), in the full and just sum of five (5%) percent of the total amount of this bid, including all alternates, lawful money of the United States, for payment of which sum, well and truly be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally firmly by these presents.

Surety represents that it is listed on the current U. S. Department of the Treasury Financial Management Service list of approved bonding companies as approved for an amount equal to or greater than the amount for which it obligates itself in this instrument or that it is a Louisiana domiciled insurance company with at least an A - rating in the latest printing of the A. M. Best's Key Rating Guide. If surety qualifies by virtue of its Best's listing, the Bond amount may not exceed ten percent of policyholders' surplus as shown in the latest A. M. Best's Key Rating Guide.

Surety further represents that it is licensed to do business in the State of Louisiana and that this Bond is signed by surety's agent or attorney-in-fact. This Bid Bond is accompanied by appropriate power of attorney.

THE CONDITION OF THIS OBLIGATION IS SUCH that, whereas said Principal is herewith submitting its proposal to the Obligee on a Contract for:

VERDA ELEMENTARY SCHOOL NEW ADMINISTRATIVE OFFICE

NOW, THEREFORE, if the said Contract be awarded to the Principal and the Principal shall, within such time as may be specified, enter into the Contract in writing and give a good and sufficient bond to secure the performance of the terms and conditions of the Contract with surety acceptable to the Obligee, then this obligation shall be void; otherwise this obligation shall become due and payable.

PRINCIPAL (BIDDER)

SURETY

BY: _____
AUTHORIZED OFFICER-OWNER-PARTNER

BY: _____
AGENT OR ATTORNEY-IN-FACT(SEAL)

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS that:

_____,
(Insert above the full name of Contractor)

(Insert above the address of Contractor)

as Principal, hereinafter called Contractor, and,

_____,
(insert above the full name or legal title of Surety)

_____,
(insert above address of Surety)

a corporation duly organized under the laws of the State of _____, authorized to do business in the State of Louisiana and having met the requirements of La. R.S. 38:2219, as Surety, hereinafter called Surety, are held and firmly bound unto:

GRANT PARISH SCHOOL BOARD
512 MAIN STREET, COLFAX, LA 71417

as Obligee, hereinafter called Owner, in the amount of: _____ Dollars (\$ _____) for the payment whereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Contractor has by written agreement dated _____, entered into a contract with Owner for Verda Elementary School New Administrative Office – Re-Bid, 2580 LA-122, Montgomery, La, in accordance with the Drawings and Specifications prepared by Barron Heinberg & Brocato, LLC, 207 Ansley Blvd, 2nd Floor, Suite D, Alexandria, LA 71303, which Contract and Contract Documents referred to therein are and by reference made a part hereof, and is hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITION of this obligation is such that, if the said Contractor shall promptly and faithfully perform all and singular the obligations assumed by said Contractor in the aforesaid Contract during the term of said Contract and any extension thereof that may be granted by the _____ (add Owner's name) _____, with or without notice to the Surety, and during the life of any term or condition, including but not limited to any guaranty period required under the Contract, or by law, and shall also perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of any and all duly authorized modifications of said Contract that may hereafter be made, notice of modifications, substitutions, additions, deletions or revisions to the Surety being hereby waived; and shall fully secure fully indemnify and protect the said _____ (add Owner's name) _____, its legal successor and representative, from all liability, which it may suffer by reason of failure to do so,, and from all costs ,damages, loss or expense of any kind, including: reimbursement and repayment to _____ (add Owner's name) _____, all outlay and expense which it may incur in making good any default, and all costs of court and all attorney's fees made necessary or arising from the failure, refusal or neglect of the Contractor, to comply with the obligations assumed by Contractor, then this bond shall be null and void; otherwise, it shall remain in full force and effect.

PROVIDED, FURTHER, that no final settlement between the Owner and the Contractor shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied. Notice of modifications, substitutions, additions, deletions or revisions of the Contract to the Surety being hereby waived;

Contractor and Surety do, by act of signing the Contract and this Bond, consent and yield to the exclusive jurisdiction of the 35th Judicial District Court for the Parish of Grant, Louisiana, and do formally waive any plea of lack of jurisdiction, on account of their residence elsewhere, in the event of any legal proceeding under the Contract or this Bond..

This Statutory Bond is furnished pursuant to the provisions of Louisiana Revised Statute 38:2216 and the only right of action which shall accrue on this Bond is solely to the benefit of the Obligee named herein and its successors or assigns, and no other person shall have any right of action based thereon

Signed and Sealed this _____ day of _____, 20 ____.

CONTRACTOR AS PRINCIPAL:

SURETY:

Company (Corporate Seal)

Company (Corporate Seal)

Signature

Signature

Name and Title

Name and Title

COUNTERSIGNED:

AGENT

ATTORNEY-IN-FACT

AGENCY CERTIFICATION

I certify that I am, as of the date of this Bond, under contract with Surety as a licensed Agent, in good standing with the Louisiana Department of Insurance having complied with La. R.S. 22:1112-1114 and La. R.S. 22:1171, residing in this State, and authorized to counter sign this Bond on behalf of Surety.

Louisiana Agent License Number

Name of Signatory:

Name of Agency:

Address:

(signature)

(Attach certified copy of Power of Attorney)

LABOR AND MATERIALS PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS that:

_____,
(Insert above the full name of Contractor)

(Insert above the address of Contractor)

as Principal, hereinafter called Contractor, and,

_____,
(insert above the full name or legal title of Surety)

_____,
(insert above address of Surety)

a corporation duly organized under the laws of the State of Louisiana, authorized to do business in the State of Louisiana and having met the requirements of La. R.S. 38:2219, as Surety, hereinafter called Surety, are held and firmly bound unto:

GRANT PARISH SCHOOL BOARD,
512 MAIN STREET, COLFAX, LOUISIANA 71417

as Obligee, hereinafter called Owner, in the amount of: _____ Dollars (\$ _____) for the payment whereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Contractor has by written agreement dated _____, entered into a contract with Owner for Verda Elementary School New Administrative Office – Re-Bid, 2580 LA-122, Montgomery, La, in accordance with the Drawings and Specifications prepared by Barron Heinberg & Brocato, LLC, 207 Ansley Blvd, 2nd Floor, Suite D, Alexandria, LA 71303, which Contract and Contract Documents referred to therein are and by reference made a part hereof, and is hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITION of this obligation is such that, if the said Contractor shall faithfully and promptly pay all claimants as defined in Louisiana Revised Statutes 38:2242 and as provided by law in Louisiana Revised Statutes 38:2241, *et seq.*; and pay all wages of laborers, workmen, or mechanics, to be employed by Contractor for all work done or labor performed, or who may be employed by any sub-contractor; and shall promptly pay all furnishers of materials or supplies provided to Contractor, or by or to sub-contractors, and used in the construction, erection, alteration, installation, or repair called for by the aforesaid Contract; and shall promptly pay for all materials or supplies furnished to said Contractor, or by or to any sub-contractor, for use in machines used by the Contractor, or any sub-contractor, in the construction, erection, alteration, installation, or repair of the work specified in the aforesaid Contract; and shall fully secure and protect the GRANT PARISH SCHOOL BOARD, its legal successor(s) and representative(s), from all liability which it may suffer by reason of failure to do so, and from all costs, damages, loss, or expense of any kind, incurred by the Owner, including all costs of court and all attorney's fees made necessary or arising from the failure, refusal or neglect of the Contractor to comply with the obligations assumed by Contractor; and, likewise, shall deliver all such work to the said GRANT PARISH SCHOOL BOARD, free from all claims, liens and expenses, then this statutory bond shall become null and void, otherwise, it shall remain in full force and effect.

PROVIDED, FURTHER, that no final settlement between the Owner and the Contractor shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied. Notice of modifications, substitutions, additions, deletions or revisions of the Contract to the Surety being hereby waived;

Contractor and Surety do, by act of signing the Contract and this Bond, consent and yield to the exclusive jurisdiction of the 35th Judicial District Court for the Parish of Grant, Louisiana, and do formally waive any plea of lack of jurisdiction, on account of their residence elsewhere, in the event of any legal proceeding under the Contract or this Bond.

This is a statutory bond furnished pursuant to the provisions of Louisiana Revised Statutes 38:2241 *et seq.*

Signed and Sealed this _____ day of _____, 20____.

CONTRACTOR AS PRINCIPAL

SURETY

Company (Corporate Seal)

Company (Corporate Seal)

Signature

Signature

Name and Title

Name and Title

COUNTERSIGNED:

AGENT

ATTORNEY-IN-FACT

AGENCY CERTIFICATION

I certify that I am, as of the date of this Bond, under contract with Surety as a licensed Agent, in good standing with the Louisiana Department of Insurance having complied with La. R.S. 22:1112-1114 and La. R.S. 22:1171, residing in this State, and authorized to counter sign this Bond on behalf of Surety.

Louisiana Agent License Number

(signature)

Name of Signatory: _____

Name of Agency: _____

Address: _____

(Attach certified copy of Power of Attorney)

SUPPLEMENTARY CONDITIONS

The following supplements modify the "General Conditions of the Contract for Construction", AIA Document A201, 2017. Where a portion of the General Conditions is modified or deleted by these Supplementary Conditions, the unaltered portions of the General Conditions shall remain in effect.

REFER TO THE GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

Add Subparagraph 1.1.1.1

1.1.1.1 The form of the Agreement shall be:

1. GRANT PARISH SCHOOL BOARD CONSTRUCTION CONTRACT FOR PROJECTS UNDER \$5,000,000- Between Owner and Contractor where the Basis of Payment is a Stipulated Sum.

Add Subparagraph 1.1.2.1:

1.1.2.1 When the Architect is required to perform extra duties made necessary because of non-performance by the Contractor of obligations under the Contract which are intended to facilitate performance of the Architects duties, the Contractor shall pay the cost of the extra duties at the hourly rate customarily charged by the Architect, plus reasonable expenses. The performance of the extra duties shall not be construed as performance of the Contractors duties under the Contract. This includes, but is not limited to:

- 1.1.2.1.1 Extensive review and notation of shop drawings made necessary because of apparent oversight or negligence by the Contractors review of same.
- 1.1.2.1.2 Extra time and travel required by the Architect to complete the Contractors list of deficiencies, (Punch List) for Substantial Completion.

Add Subparagraph 1.2.1.1:

1.2.1.1 Wherever the terms "as directed", "as required", or words of like effect are used herein, they shall mean as directed or required by the Architect to carry out the requirements of the Contract Documents; "as shown", "as indicated", or "as detailed" shall mean as shown, indicated or detailed on the drawings; "work" includes labor and materials. "Provide" means provide labor, materials and services. Wherever the words "approved", "acceptable", "satisfactory", or words of like effect are used herein, they shall mean approved by, acceptable to, or satisfactory to the requirements of the Contract Documents as interpreted by the Architect.

Add Subparagraph 1.2.1.2 and its subparagraphs and paragraph 1.2.1.3.

1.2.1.2 In the event of conflicts or discrepancies among the Contract Documents, interpretations will be based on the following priorities.

- .1 The Agreement.
- .2 Addenda, with those of later date having precedence over those of earlier date.
- .3 The Supplementary Conditions.

4. The General Conditions of the Contract for Construction.
5. Drawings and Specifications.

1.2.1.3 In the case of inconsistency between Drawings and Specifications or within either Document not clarified by addendum, the better quality or greater quantity of Work shall be provided in accordance with the Architect's interpretation.

Add Subparagraph 2.2.5.1 and substitute the following:

2.2.5.1 Upon the contractor's request, within 10 days of notification by the Owner of intent to award the contract, the Architect will submit to the Contractor such copies of the bid documents that have been returned in good condition subsequent to bidding, and which shall bear the Architect's "FOR FIELD USE" stamp. The Architect may retain such copies as the Architect may determine are necessary for his performance of duties.

Modify paragraph 3.7.1

Delete the phrase or negotiations concluded from the end of the paragraph.

Add Subparagraph 3.7.1.1

3.7.1.1 The Contractor shall legally record the contract in the courthouse of the parish in which the project is located and pay any recording fees.

Add Subparagraph 3.12.7.1

3.12.7.1 All shop drawings shall be checked and coordinated by the Contractor and his Sub-Contractor and/or supplier, before submission for Architects' approval. Drawings shall bear Contractor's stamp of approval on each sheet of every set submitted as evidence of such checking and coordination. Include a copy of a completed Submittal Cover Sheet as provided by the Architect. Non-compliance may result in return to the Contractor unchecked for proper re-submission. A handling charge may be assessed by the architect for handling non-complying submittals.

Modify 4.2.7 as follows: In the first sentence delete the words approve or take other and replace with the word take so the beginning of the sentence shall read The Architect will review and take appropriate action.

Modify 4.2.10 as follows: delete the second sentence of the paragraph and substitute: The duties, responsibilities and limitations of authority of such project representatives shall be in accordance with AIA Document B-532 unless otherwise defined in the contract documents.

Delete Paragraphs 5.2, 5.2.1, 5.2.2, 5.2.3 and 5.2.4 in their entirety.

Insert paragraph 8.1.1.1

8.1.1.1 The Contract Time shall be **365 calendar days** from the date of commencement of the work as established in the Agreement, or as directed by a Notice to Proceed.

Add the following Paragraph 8.2.1.1:

8.2.1.1 The Contractor and the Contractor's surety, if any, shall be liable for and shall pay the Owner the sums hereinafter stipulated as liquidated damages for each calendar day of delay until the Work is substantially complete:

Four Hundred Dollars (\$400.00) Liquidated Damages.

Add Subparagraph 8.3.1.1:

8.3.1.1 Following are considered anticipated days of adverse weather on a monthly basis as averaged on a five-year basis. Changes to Contract for Time Extension for rain delay will not be granted unless substantial rain falls on more days than below and work is actually delayed.

January	11 days
February	10 days
March	8 days
April	7 days
May	5 days
June	6 days
July	6 days
August	5 days
September	4 days
October	3 days
November	5 days
December	6 days

Add the following sentence to Subparagraph 9.3.1:

The form of Application for Payment shall be a notarized AIA Document G702, Application and Certification for Payment, supported by AIA Document G703, Continuation Sheet.

Add the following Clauses 9.3.1.3 and 9.3.1.3.1 to 9.3.1:

9.3.1.3 Until final payment, the Owner shall pay the following percent of the amount due the Contractor on account of progress payments.

9.3.1.3.1 For Projects for which the Contract amount is Five Hundred Thousand Dollars (\$500,000.00) or more, 95 percent. For Projects for which the Contract amount is less than Five Hundred Thousand Dollars (\$500,000.00), 90 percent.

Add Paragraph 11.1.2.1 and 2 and their subparagraphs

11.1.2.1 Compensation Insurance: The Contractor shall pay for and shall maintain during life of this Contract Workmen's Compensation Insurance as required by applicable State or Territorial Law for all of his employees to be engaged in work at the site of the Project under this Contract and/in case of such work sublet, the Contractor shall require the Sub-Contractor similarly to provide Workmen's Compensation Insurance for all of the latter's employees to be engaged in such work unless such employees are covered by the protection afforded the Contractor's Workmen's Compensation Insurance. In case any class of employees engaged in hazardous work on the project under this

Contract is not protected under the Workmen's Compensation Statute, the Contractor shall provide and shall cause each Sub-Contractor to provide adequate Employer's Liability Insurance for the protection of such of his employees as are not otherwise protected.

11.1.2.2 Contractor's Public Liability and Property Damage Insurance and Vehicle Liability Insurance: The Contractor shall pay for and maintain during life of this Contract such public liability and property damage insurance, including the operation of motor vehicles, with limits as hereinafter provided, which will cover the Contractor's liability arising out of work performed by the Contractor or any Sub-Contractor, and by anyone directly or indirectly employed by either of them, for claims for damages for personal injury, including accidental death, as well as for claims for property damages, which may arise from operation under this Contract. The limits of such insurance shall be as follows:

1. **Public Liability Insurance:** An amount of not less than \$1,000,000.00 each occurrence \$2,000,000 aggregate for bodily injuries, including accidental death, to any one person, and subject to same limit for each person on account of one accident.
2. **Property Damage Insurance:** An amount of not less than \$1,000,000.00 each occurrence to cover all sums which the Contractor or Sub-Contractor shall be obligated to pay be reason of liability imposed upon him by law for damages because of injury to or destruction of property.
3. **Vehicle Liability Insurance:** Bodily injury \$500,000 each person, \$1,000,000 aggregate. Property damage, \$100,000 each occurrence.
4. **Umbrella Excess Liability Insurance:** \$1,000,000 over primary insurance.
5. **Sub-Contractor's Public Liability and Property Damage Insurance and Vehicle Liability Insurance:** The Contractor shall either require each of his Sub-Contractors to pay for and maintain during the life of his subcontract, Sub-Contractor's Public Liability and Property Damage Insurance of the type specified in subparagraphs 11.1.2.1.1.1, 11.1.2.1.1.1 and 11.1.2.1.1.1 above in the same limits indicated above, or insure the activities of his Sub-Contractors in his policy.

Add following paragraph 11.1.3.1

11.1.3.1 Furnish two (2) bound copies of Certificates of Insurance to Architect with the Owners written acceptance.

Substitute the following for Paragraph 11.5.1

11.5.1 The Contractor shall furnish and pay for a Performance and Payment bond, in a Surety Company authorized to do business in the State of Louisiana, and which is named in the current list of ACompanies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies@ as published in Circular 570 (amended) by the Audit Staff, Bureau of Government Financial Operations, U.S. Treasury Department in an amount at least equal to one hundred percent (100%) of the Contract Price as security for the faithful performance of the Contract and for the payment of all persons performing labor and furnishing materials in connection with the Contract. The premium shall be paid by the Contractor. The Contractor shall deliver the bond to the Architect for transmittal to the Owner with the Contract not later than the date of

execution of the Contract, or if the work is commenced prior thereto in response to a notice to proceed, the Contractor shall, prior to commencement of the work, submit evidence satisfactory to the Owner that such bond will be issued.

END OF SUPPLEMENTAL CONDITIONS

STATE OF LOUISIANA

PARISH OF _____ Grant _____

**AFFIDAVIT PURSUANT TO
LOUISIANA REVISED STATUTES TITLE 38, CHAPTER 10**

BEFORE ME, the undersigned authority, personally came and appeared _____, who after being by me duly sworn deposed and said that he/she is the fully authorized _____ of _____ (hereinafter referred to as the “Bidding Entity”), a party that has submitted a bid opened on _____, 20__ to the _____ **(ADD OWNER’S LEGAL NAME)** for Verda Elementary School – New Administrative Office – Re-Bid, Project No. 25005/CSW, and said affiant further said and attested that:

Employees Verification System (La. R.S. 38:2212:10)

- A. The Bidding Entity is registered and participates in a status verification system to verify that all of its employees in the state of Louisiana are legal citizens of the United States or are legal aliens.
- B. If awarded the contract, the Bidding Entity shall continue, during the term of the contract, to utilize a status verification system to verify the legal status of all new employees in the state of Louisiana.
- C. If awarded the contract, the Bidding Entity shall require all subcontractors to submit to it a sworn affidavit verifying compliance with Paragraphs (A) and (B) above.

Contract Not Secured through Employment or Payment of Solicitor (La. R.S. 38:2224)

- A. Bidding Entity has employed no person, corporation, firm, association, or other organization, either directly or indirectly, to secure the public contract for the above-referenced Project, other than persons regularly employed by the Bidding Entity whose services in connection with the construction, alteration or demolition of the public building or Project or in securing the public contract were in the regular course of their duties for the Bidding Entity; and
- B. If awarded the contract, no part of the contract price to be received by the Bidding Entity will be paid to any person, corporation, firm, association, or other organization for soliciting the contract, other than the payment of their normal compensation to persons regularly employed by the Bidding Entity whose services in connection with the construction, alteration or demolition of the public building or project were in the regular course of their duties for the Bidding Entity.
- C. Neither he, the Bidding Entity, nor any of its principals are presently debarred, suspended, proposed for debarment or otherwise declared ineligible to participate in any transaction with any Federal department or agency

No Unpaid Workers Compensation Insurance (La. R.S. 38:2212.10)

La. R.S. 23:1726 prohibits any entity against whom an assessment under Part X of Chapter 11 of Title 23 of the Louisiana Revised Statutes of 1950 (Alternative Collection Procedures & Assessments) is in effect, and whose right to appeal that assessment is exhausted, from submitting a bid or proposal for or obtaining any contract pursuant to Chapter 10 of Title 38 of the Louisiana Revised Statutes of 1950 and Chapters 16 and 17 of Title 39 of the Louisiana Revised Statutes of 1950. Bidder certifies that no such assessment is in effect against the Bidding Entity.

No Discrimination against Firearm and Ammunition Industries (La. R.S. 38:2216.1)

- A. Bidding Entity does not have a practice, policy, guidance, or directive that discriminates against a firearm entity or firearm trade association based solely on the entity's or association's status as a firearm entity or firearm trade association.
- B. If awarded this contract, Bidding Entity will not discriminate against a firearm entity or firearm trade association during the term of the contract based solely on the entity's or association's status as a firearm entity or firearm trade association.

Criminal Convictions (La. R.S. 38:2227(C)(2) and La. R.S.38:2212.9(C))

- A. He/she personally has not been convicted of, nor has he/she entered a plea of guilty or nolo contendere to, any of the crimes or equivalent federal crimes listed below. That further, no individual partner, incorporator, director, manager, officer, organizer, or member, who has a minimum of a ten percent ownership in the Bidding Entity, has been convicted of, or has entered a plea of guilty or nolo contendere to, any of the crimes or equivalent federal crimes listed below.
 - 1. A conviction of, or plea of guilty or nolo contendere to, the following state crimes or equivalent federal crimes shall permanently bar any person or the bidding entity from bidding on public projects:
 - a. Public bribery (R.S. 14:118)
 - b. Corrupt influencing (R.S.14:120)
 - c. Extortion (R.S. 14:66)
 - d. Money laundering (R.S. 14:230)
 - 2. A conviction of, or plea of guilty or nolo contendere to, the following state crimes or equivalent federal crimes shall bar any person or the bidding entity from bidding on public projects for a period of five years from the date of conviction or from the date of the entrance of the plea of guilty or nolo contendere
 - a. Theft (R.S. 14:67)
 - b. Identity theft (R.S. 14:67.16)
 - c. Theft of a business record (R.S. 14:67.20)
 - d. False accounting (R.S. 14:70)
 - e. Issuing worthless checks (R.S. 14:71)
 - f. Bank fraud (R.S. 14:71.1)
 - g. Forgery (R.S. 14:72)
 - h. Contractors; misapplication of payments (R.S. 14:202)

i. Malfeasance in office (R.S. 14:134)

The five-year prohibition shall apply only if the crime was committed during the solicitation or execution of a contract or bid awarded pursuant to procurement these provisions of Chapter 10 of Title 38.

- B. No individual partner, incorporator, director, manager, officer, organizer, or member with an ownership interest of five percent or more has been convicted of, or has entered a plea of guilty or nolo contendere to any state felony crime or equivalent federal felony crime committed in the solicitation or execution of a contract or bid awarded under the laws governing public contracts under the provisions of Chapter 10 of Title 38 or the provisions of Chapter 17 of Title 39, regarding professional, personal, consulting, and social services.
- C. If evidence is submitted to the School Board substantiating that a false attestation has been made and the project must be readvertised or the contract cancelled, the awarded entity making the false attestation shall be responsible to the School Board for the costs of rebidding, additional costs due to increased costs of bids and any and all delay costs due to the rebid or cancellation of the above described project as provided in R.S. 38:2227 C(2) and La. R.S.38:2212.9 (C).

Name of Bidding Entity: _____

(signature)

Name/Title of Signatory: _____

Name of Bidding Entity: _____

Address: _____

SWORN TO AND SUBSCRIBED BEFORE ME
THIS _____ DAY OF _____, 20____.

Notary Public

This completed, signed and notarized affidavit is to be submitted by the apparent low Bidder within ten (10) days after the Bid Opening.

AFFIDAVIT REGARDING CRIMINAL CONVICTIONS

STATE OF LOUISIANA

PARISH OF _____

BEFORE ME, the undersigned authority, personally came and appeared _____, who after being by me duly sworn deposed and said that he/she is the fully authorized _____ of _____ (hereinafter referred to as Bidder), the party who submitted a bid opened on _____, 20__, to the **Grant Parish School Board** for _____, Project No. _____, and said affiant further said and attested that:

A. He/she personally has not been convicted of, nor has he/she entered a plea of guilty or nolo contendere to, any of the crimes or equivalent federal crimes listed below. That further, no individual partner, incorporator, director, manager, officer, organizer, or member, who has a minimum of a ten percent ownership in the bidding entity, has been convicted of, or has entered a plea of guilty or nolo contendere to, any of the crimes or equivalent federal crimes listed below.

1. A conviction of, or plea of guilty or nolo contendere to, the following state crimes or equivalent federal crimes shall permanently bar any person or the bidding entity from bidding on public projects:
 - a. Public bribery (R.S. 14:118)
 - b. Corrupt influencing (R.S. 14:120)
 - c. Extortion (R.S. 14:66)
 - d. Money laundering (R.S. 14:230)
2. A conviction of, or plea of guilty or nolo contendere to, the following state crimes or equivalent federal crimes shall bar any person or the bidding entity from bidding on public projects for a period of five years from the date of conviction or from the date of the entrance of the plea of guilty or nolo contendere
 - a. Theft (R.S. 14:67)
 - b. Identity theft (R.S. 14:67.16)
 - c. Theft of a business record (R.S. 14:67.20)
 - d. False accounting (R.S. 14:70)
 - e. Issuing worthless checks (R.S. 14:71)
 - f. Bank fraud (R.S. 14:71.1)
 - g. Forgery (R.S. 14:72)
 - h. Contractors; misapplication of payments (R.S. 14:202)
 - i. Malfeasance in office (R.S. 14:134)

The five-year prohibition shall apply only if the crime was committed during the solicitation or execution of a contract or bid awarded pursuant to procurement these provisions of Chapter 10 of Title 38.

B. No individual partner, incorporator, director, manager, officer, organizer, or member with an ownership interest of five percent or more has been convicted of, or has entered a plea of guilty or nolo contendere to any state felony crime or equivalent federal felony crime committed in the solicitation or execution of a contract or bid awarded under the laws governing public contracts under the provisions of Chapter 10 of Title 38 or the provisions of Chapter 17 of Title 39, regarding professional, personal, consulting, and social services.

C. If evidence is submitted to the School Board substantiating that a false attestation has been made and the project must be readvertised or the contract cancelled, the awarded entity making the false attestation shall be responsible to the School Board for the costs of rebidding, additional costs due to increased costs of bids and any and all delay costs due to the rebid or cancellation of the above described project as provided in R.S. 38:2227 C(2) and La. R.S.38:2212.9 (C).

Print Name: _____

SWORN TO AND SUBSCRIBED BEFORE ME THIS _____ DAY OF _____, 2026.

NOTARY PUBLIC

This completed and signed attestation is to be submitted by the apparent low Bidder within ten (10) days after the Bid Opening.

PROJECT NO.:BHB: 25005/CSW – Re-Bid
NAME: New Administrative Office for Verda Elementary School
LOCATION: 2580 LA-122
Montgomery, LA

NON-COLLUSION AFFIDAVIT

Before me, the undersigned authority, duly commissioned and qualified within and for the State and Parish aforesaid, personally came and appeared _____ representing «Contractor» who, being by me first duly sworn deposed and said that he has read this affidavit and does hereby agree under oath to comply with all provisions herein as follows:

PART I.

Section 2224 of Part II of Chapter 10 of Title 38 of the Louisiana Revised Statutes, as amended.

(1) That affiant employed no person, corporation, firm, association, or other organization, either directly or indirectly, to secure the public contract under which he received payment, other than persons regularly employed by the affiant whose services in connection with the construction, alteration or demolition of the public building or project or in securing the public contract were in the regular course of their duties for affiant; and

(2) That no part of the Contract price received by affiant was paid or will be paid to any person, corporation, firm, association, or other organization for soliciting the Contract, other than the payment of their normal compensation to persons regularly employed by the affiant whose services in connection with the construction, alteration or demolition of the public building or project were in the regular course of their duties for affiant.

PART II.

Section 2190 of Part I of Chapter 10 of Title 38 of the Louisiana Revised Statutes, as amended.

That affiant, if an architect or engineer, or representative thereof, does not own a substantial financial interest, either directly or indirectly, in any corporation, firm, partnership, or other organization which supplies materials for the construction of a public work when the architect or engineer has performed architectural or engineering services, either directly or indirectly, in connection with the public work for which the materials are being supplied.

For the purposes of this Section, a "substantial financial interest" shall exclude any interest in stock being traded on the American Stock Exchange or the New York Stock Exchange.

That affiant, if subject to the provisions of this section, does hereby agree to be subject to the penalties involved for the violation of this section.

AFFIANT

SWORN TO AND SUBSCRIBED BEFORE ME THIS _____ DAY OF _____, 2026.

NOTARY

SUBMITTAL COVER SHEET

(Attach one copy of this cover sheet to each copy of the submittal)

DATE: _____ ARCHITECT'S PROJECT NO. 25005/CSW – RE-BID

PROJECT: NEW ADMINISTRATIVE OFFICE FOR VERDA ELEMENTARY SCHOOL

SPECIFICATION SECTION NO. & DESCRIPTION OF ITEM:

1. ORIGINAL SUBMITTAL 2. RESUBMITTAL NO. _____

3. ARCHITECTURAL 4. STRUCTURAL 5. MECHANICAL 6. ELECTRICAL 7. OTHER

GENERAL CONTRACTOR:

Ph. _____ Fax _____

SUBCONTRACTOR:

MATERIAL SUPPLIER:

Ph. _____ Fax _____

Ph. _____ Fax _____

We have determined and verified materials, field measurements and field construction criteria related to the submittal contained herein, and have checked and coordinated the information contained within this submittal with the requirements of the Work and of the Contract Documents and of other related submittals except as otherwise indicated below.

- A We have not verified field conditions. We accept the responsibility for the adverse effects of varying field conditions upon the portions of work included in the submittal contained herein.
- B The submittal deviates from the requirements of the construction documents only as follows: (include separate page if required, indicate here if required)
- C The information contained in this submittal does not deviate in any way from the requirements of the Construction Documents.

By: Project Manager for Prime Contractor: _____



Geotechnical Testing Laboratory, Inc.

Engineering and Construction Materials Testing Services

August 15, 2025

Grant Parish School Board

c/o Gaspard Construction Services, LLC
1023 Legacy Loop
Pineville, Louisiana 71360
Attention: Mr. Scott Gaspard

**Barron, Heinberg & Brocato
Architects and Engineers**

207 Ansley Boulevard, Suite D, Second Floor
Alexandria, Louisiana 71303
Attention: Mr. Jay Lynch, AIA

**RE: Geotechnical Investigation Services
Verda Elementary School
New Administration Building and Site Improvements
2580 LA Highway 122
Montgomery, Grant Parish, Louisiana
Job Number 25005 I CSW
Report Number 08-25-078**

Dear Mr. Gaspard:

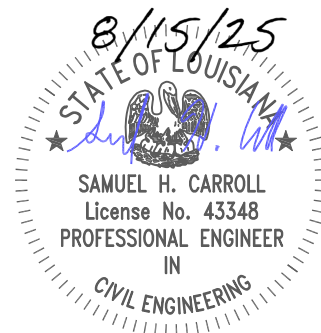
Geotechnical Testing Laboratory, Inc. is pleased to submit this report of subsurface exploration for the above referenced project. Included in the report are the results of the exploration and recommendations concerning the design and construction of the foundations as well as general site development.

We appreciate the opportunity to have provided you with our geotechnical engineering services. If you have any questions concerning this report, or if we may be of further service, please contact our office.

Respectfully submitted,
Geotechnical Testing Laboratory, Inc.

Samuel "Heath" Carroll, P.E.
Louisiana Registration No. 43348

Ken Gorsha
President



SHC/krq

Geotechnical Investigation Services
Verda Elementary School
New Administration Building and Site Improvements
2580 LA Highway 122
Montgomery, Grant Parish, Louisiana
Job Number 25005 I CSW
Report Number 08-25-078

Prepared For:

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Introduction:

This report transmits the findings of a geotechnical investigation performed for the above-referenced project. The purpose of this investigation was to define and evaluate the general subsurface conditions in the immediate vicinity of a new facility and proposed site improvements. Specifically, the study was planned to determine the following:

- Subsurface stratigraphy within the limits of our exploratory borings.
- Classification, strength, and compressibility characteristics of the foundation strata.
- Suitable foundation systems and allowable soil bearing pressures.
- Construction requirements for the placement of select earth fills.
- Recommendations for rigid and flexible pavement sections for unspecified traffic.

The purpose of this report is to provide the architect, structural engineer, civil engineer, and other design team professionals with recommendations for the design and construction of the proposed project. This report should not be used by the contractor in lieu of project plans or specifications.

Project Authorization:

Formal authorization to perform the work was provided by The Grant Parish School Board (Client), by accepting our July 23, 2025 written proposal. Written authorization to proceed was provided by Purchase Order Number 20260323 issued on July 30, 2025. Field procedures were conducted on August 5, 2025. To accomplish the intended purposes, a three-phase study program was conducted which included:

- a field investigation consisting of 12 exploratory test borings with samples obtained at selected intervals;
- a lab testing program designed to evaluate the expansive and strength characteristics of the subsurface soils; and,
- an engineering analysis of the field and laboratory test data for foundation design recommendations.

No additional analysis was requested. A brief description of the field and laboratory test procedures are provided in the Appendix.

Project Description:

We understand the project will consist of a one-story, slab-on-grade, wood-framed structure containing approximately 2,500 square feet of area with associated light and moderate duty pavements. No below grade walls are anticipated.

For the purpose of this report, we have assumed that maximum column loads will not exceed approximately 25 kips (1 kip = 1,000 pounds), and that maximum continuous wall loads will be less than two (2) kips per linear foot. Based on the existing site topography, it appears that the

building pad area will receive a fill of approximately 12 inches to reach the design grades. If larger grade changes are anticipated, these should be discussed with our geotechnical engineer prior to finalizing design.

If any of this information should change significantly or be in error, it should be brought to our attention so that we may review recommendations made in this report.

Site Conditions:

The project site is at physical address 2580 LA Highway 122 in Montgomery, Grant Parish, Louisiana. The site was noted to be relatively level with estimated maximum elevation differences of no more than one (1) to two (2) feet, and was vegetated with weeds, grass, and trees at the time of drilling. Asphalt and stone pavements were observed within the site. The drilling rig experienced no difficulty moving about the site.

Subsurface Stratigraphy:

The subsurface conditions at the proposed building site were explored by drilling a total of two (2) borings to a depth of approximately 20 feet. Additionally, the parking and drive areas were explored by drilling ten (10) borings to a depth of approximately five (5) feet. The borings were located in the field by the drilling crew as shown on the Plan of Borings included in the Appendix of this report.

The stratification of the soils encountered during field drilling operations is presented on the boring logs in the Appendix. The stratification of the subsurface materials shown on the boring logs represents the subsurface conditions encountered at the actual boring locations and variations may occur across the site. The lines of demarcation represent the approximate boundary between the soil types, but the actual transition may be gradual. The following subsurface descriptions are of a generalized nature to highlight the major stratification features. The boring logs should be reviewed for more detailed information.

In order of increasing depth, the borings generally encountered the following soil strata beneath the surface: silty sand (SC), slightly clayey silty sand (SC-SM) and clayey sand (SC).

Groundwater Conditions:

Groundwater seepage was not observed during advancement of the test borings and, after short time lapses, the borings remained dry and un-caved. The subsurface water regime is always subject to change with variations in climatic conditions and will likely coincide with seasonal fluctuations. Future construction activities may also alter the surface and/or subsurface drainage patterns of this site. Therefore, groundwater conditions should be explored at the start of construction by others due to short-term observations by our field crew.

Perched water may be briefly encountered in low quantities during earthwork and is typically due to storage of recent rainfall or by a barrier to capillary evaporation. Where perched water is encountered the contractor should expect to excavate gravity drainage ditches to divert it away from the construction area. The depth of the ditches should be at least two (2) to three (3) feet deeper than the lowest exterior footing elevation. Additionally, soft, wet and pumpable soils can be expected below perched water tables. In structural areas, these should be removed to firm ground and replaced with select fill soils compacted to project specifications as defined later in this report.

Foundation Recommendations:

Detailed information on structural systems and planned grading was not available to us at the time this report was prepared. Based on the size and type of structure, as well as the findings from this investigation, a system of shallow footings with an on-grade floor slab, in conjunction with the recommended subgrade preparation is believed to be the most practical and economical means of support.

A Potential Vertical Rise (PVR) value of less than one (1) inch was determined for this site. One (1) inch of PVR is generally accepted as the maximum allowable value for design and construction in the geographical area. The surficial soils encountered by the borings are considered to be moderately expansive. There should be no requirement for the removal of swelling soils at this site.

Positive drainage away from the structure should be provided at all times, including during construction. If positive drainage is not provided, water will pond around or below the building and excessive total and differential movements may occur. Proper surface drainage should be maintained, and landscape irrigation systems should be located and operated in a manner to minimize wetting of building foundations. After installation, the irrigation system should be pressure tested and any leaks repaired.

Foundation Subgrade Preparation:

To prepare for foundation and soil supported floor slab construction, we recommend that all topsoil, vegetation, roots, and any soft soils in the building area be stripped from the site and either properly disposed or stockpiled for later use in landscaping. Utilities should be located and rerouted as necessary.

Any trees or tree stumps located within the building pad should be grubbed and removed. The diameter of the excavation should be at least three (3) feet larger than the tree diameter and dry soils and roots $\frac{1}{2}$ inch in diameter or greater should be grubbed to a minimum depth of four (4) feet below finished subgrade elevation. The resulting depression should be backfilled and compacted as recommended in the Select Fill Section of this report.

To remediate the variable soil conditions in the surficial zone and provide a consistent subgrade for slab support, GTL recommends that a uniform layer of density-approved select fill be provided beneath the floor slab. After stripping the site, the building pad should be cut to an elevation which allows the placement of at least two (2) feet of density-approved select fill below the final subgrade elevation for the floor slab. The select fill building pad should extend at least five (5) feet beyond the edge of the building.

After stripping and undercutting as required herein, the building area should be proof-rolled with a heavy, loaded pneumatic-tired vehicle such as a 20 to 25 ton loaded dump truck. It is recommended that all areas beneath the floor slab be proof-rolled to identify loose or soft soils. All proof-rolling and undercutting activities should be witnessed by GTL or authorized representative and should be performed during a period of dry weather. Any weak areas which yield under the proof-roll, or any areas with a tendency to pump should be mitigated. Such mitigation may include over-excavation and backfilling, reprocessing to remove moisture, modification with lime or cement admixture, or using geotextiles. In the event such mitigation is required, the geotechnical engineer should be contacted to design an appropriate procedure.

After proof-rolling but prior to placing fill, the exposed soils should be scarified and then processed to a moisture content between one (1) percentage point below and three (3)

percentage points above the Standard Proctor optimum. The subgrade soils should be re-compacted to a dry density of at least 95 percent of the Standard Proctor (ASTM D-698) maximum dry density for a depth of at least eight (8) inches below the surface.

Select Fill:

After the subgrade has been prepared and inspected, fill placement may begin. Select fill material should be free of organic or other deleterious materials, homogeneous mixture, have a maximum particle size of three (3) inches, have a liquid limit less than 40 and plasticity index between 8 and 20, and consist of silty-clayey sands (SM-SC), low plasticity sandy clays (CL), or clayey sands (SC) as defined by the Unified Soil Classification System. In addition to the above requirements, the material should have a minimum of 30 percent retained on the No. 200 sieve. It appears that most of the on-site surficial soils meet the requirement for use as select fill on this project. If a fine-grained material is used for fill, very close moisture content control will be required to achieve the recommended degree of compaction.

Fill should be placed in maximum lifts of eight (8) inches of loose materials and should be compacted within the range of one (1) percentage point below to three (3) percentage points above the optimum moisture content value and a minimum of 95 percent of the maximum density as determined by the Standard Proctor (ASTM D-698) test. If water must be added, it should be uniformly applied and thoroughly mixed into the soil by disking or scarifying.

The building pad should extend at least five (5) feet beyond the edge of the structure prior to sloping. Each lift of compacted soil should be tested and inspected by the soils engineer or his representative prior to placement of subsequent lifts. As a guideline, it is recommended that field density tests be taken at a frequency of not less than one (1) test per 2,500 square feet of surface area per lift or a minimum of four (4) per lift for each tested area for the building.

The fill can be used to elevate the building pad so that positive drainage is provided away from the building. Where feasible, elevating the building pad with fill is generally desirable because this aids in providing positive drainage away from the floor slab and foundations and helps prevent water from collecting in the filled area.

Shallow Footings:

Perimeter footings should bear at a minimum nominal depth of 24 inches below the planned finished floor elevation or 18 inches below exterior adjacent grade, whichever is deeper. Spread footings for columns and strip footings for walls may be designed for a maximum net allowable soil bearing pressure of 2,000 psf and 1,500 psf, respectively, based on dead load plus design live load. Minimum foundation widths for column and strip footings should be 24 inches and 14 inches, respectively, even if the bearing pressures are less than the recommended values.

The factor of safety for the above bearing values is 3.0. Total settlement is estimated to be on the order of one (1) inch or less for foundation units designed in accordance with recommendations provided herein. Differential settlements are estimated to be on the order of ½ inch or less. Approximately half of this settlement is expected to occur during construction. The remaining long-term settlement of ½ inch (¼ occurring differentially) should be tolerable.

All foundation excavations should be inspected by GTL or an authorized representative prior to steel and concrete placement to assess whether the foundation materials appear consistent with the boring logs. Soft or loose soil zones encountered at the bottom of the footing excavations should be removed and the cavity should be backfilled with compacted select fill, flowable grout fill, crushed stone flexible base, concrete, or other approved material and placement control.

Floor Slab and Grade Beams:

Construction of select fill as specified herein beneath the building should result in the development of a modulus of subgrade reaction (k_s) to range between 125 and 150 pounds per cubic inch based upon empirical equations that estimate the results of a plate load test.

Utilities which project through the slab on grade should be designed with either some degree of flexibility or with sleeves. Such design features will help reduce damage to utility lines if vertical movements occur.

The floor slab may be placed monolithically with the grade beams, or designed and constructed as a floating slab where an isolation joint separates the floor slab from all grade beams and columns. In the former case, a crack or hinge joint may develop in the slab parallel to the exterior grade beams. The floor system type should be selected and designed by the structural engineer after considering the advantages and disadvantages of each.

Membrane Under Slab:

The decision as to whether a synthetic membrane (polyethylene or HDPE sheeting, etc.) is required below the slab should be made by the architect and structural engineer based on planned floor coverings, proximity of groundwater, planned site grading and drainage patterns, tolerance for curling, local custom, weather conditions at the time of construction, and other pertinent considerations.

Seismicity:

Based on Section 1613 of the IBC-2015, a Site Class of D has been estimated for this site due to the lack of subsurface information to a depth of 100 feet. According to the USGS website for Seismic Hazard Design Parameters, the project site has a mapped 0.2 second spectral response acceleration (S_s) of 0.116 g. The project also has a mapped 1.0 second spectral response acceleration (S_1) of 0.065. The design spectral response accelerations, S_{DS} and S_{DI} , were determined to be 0.124 g and 0.105 g, respectively. Based on Tables 1613.3.5(1) and 1613.3.5(2), the site has an assigned Seismic Design Category of B for structures classified as Risk Categories I, II, and III. For structures classified as Risk Category IV, site has an assigned Seismic Design Category of C.

Pavement Recommendations:

Our scope of services did not include extensive sampling and CBR testing of existing subgrade or potential sources of imported base material for the specific purpose of a detailed pavement analysis. Instead, we have assumed pavement related design parameters that are typical for the area soil types. It has been assumed that the constructed pavement subgrade will consist of well compacted soils. Based on experience, it is anticipated that the compacted native subgrade will yield a California Bearing Ratio (CBR) of at least 10.0.

The satisfactory performance of pavements for parking and drive areas depends upon several factors including the characteristics of the supporting soil, the magnitude and frequency of wheel load applications, quality of construction materials, the contractor's placement and workmanship abilities, good drainage, and the desired period of design life.

Pavements to be utilized by light vehicular traffic may be either flexible or rigid pavement sections supported on well-compacted subgrade or select fill. However, Portland cement concrete pavements should be utilized where large loads (i.e., waste disposal containers, etc.) are located. Both flexible and rigid pavement sections have been designed using general engineering design criteria referenced above.

Traffic and Design Data:

Commercial pavement sections presented herein are based upon minimum material thickness as recommended by the Asphalt Institute and the Portland Cement Association. These sections are not based upon anticipated traffic loads as these were not available at the time this report was prepared. If traffic in excess of normal light to moderate duty traffic as stated above is anticipated (i.e., heavy trucks, medium duty loaded trucks, high automobile traffic, etc.), GTL should be contacted for additional recommendations.

The information for the design of the pavement system(s) is presented below. All referenced sections are in accordance with the State of Louisiana, Department of Transportation and Development, Standard Specifications for Roads and Bridges, 2016 Edition.

Subgrade:

It is paramount to the satisfactory performance of pavements that the subgrade be stable under loads and compacted prior to deployment of flexible base or concrete. All pavement subgrade should be proof rolled prior to beginning placement of pavement section materials. Stable subgrade is especially critical to the successful performance of flexible pavement sections.

Bulk samples of the anticipated subgrade (if existing soils are used) were subjected to standard laboratory tests to determine its usability beneath flexible and Portland cement concrete pavements. The results of those tests indicate some existing materials are considered Usable beneath either pavement type. Hydrometer analyses can be viewed on the applicable Log of Borings included in the Appendix of this report.

Recommended Pavement Sections:

The table below presents a summary of both rigid and flexible pavement sections for light and moderate-duty applications. It should be noted that the pavement sections as presented below are minimums. If it is desired to reduce potential cracking, greater thickness of select fill and/or greater pavement section thickness could be utilized. In addition, long term pavement performance requires good drainage and performance of periodic maintenance activities. Refer to the text for qualification of the designs and further discussion and limitations.

MINIMUM PAVEMENT RECOMMENDATIONS *		
Pavement Type	Light Duty (Parking Stalls)	Moderate Duty (Entries & Drives)
Portland Cement Concrete	5.0" Portland Cement Concrete 8.0" Compacted Subgrade	6.0" Portland Cement Concrete 8.0" Compacted Subgrade
Asphalt Crushed Stone Base	2.0" Hot Mixed Asphaltic Concrete 6.0" Base Course Aggregate 8.0" Compacted Subgrade	3.0" Hot Mixed Asphaltic Concrete 8.0" Base Course Aggregate 8.0" Compacted Subgrade
Asphalt Over Cement Stabilized Base	2.0" Hot Mixed Asphaltic Concrete 8.0" Density Approved Cement-Stabilized Base	3.0" Hot Mixed Asphaltic Concrete 8.0" Density Approved Cement-Stabilized Base
*Materials should meet general requirements of the Louisiana DOTD Standard Specifications for Construction of Roads & Bridges, and specific requirements listed herein.		

Soils Beneath Flexible Pavements:

The existing soils are considered Usable beneath flexible pavements. Additional fill required to grade the site should consist of Soils for Soil Cement Base Course that will stabilize with cement in accordance with DOTD TR432. Such materials are found in section 301.01.1 and classified as A-1-a, A-1-b, A-2-4, A-2-6, A-4, and A-6 in accordance with DOTD TR423. Soil

with a Liquid Limit (LL) greater than 35, a Plasticity Index of (PI) greater than 15, or an organic content greater than two (2) percent should not be used. Soil with over 79 percent sand or 60 percent silt when tested in accordance with DOTD TR407 should not be used. Blending to meet any of these requirements is not allowed. The minimum treatment percentage is presented further in this report.

Cement Stabilized Soils:

In-place cement stabilized base course should be constructed and tested in accordance with Section 303. The top eight (8) inches of existing subgrade may be stabilized utilizing not less than eight (8) percent by volume of Portland cement, unless laboratory tests permit a lesser percentage. In no case should less than five (5) percent by volume be used to stabilize the base. The mixture should generate a minimum of 300 psi in seven (7) days. Pulverization should be maintained in accordance with Subsection 303.04 throughout the treatment process.

The cement-treated material should be compacted at a moisture content at or near the optimum value as defined by DOTD TR 418 Method A (ASTM D-698). Compaction should be at least 95 percent of the maximum dry density defined by this standard. The required moisture content and density of the compacted material should be maintained until construction is complete. As a guideline, it is recommended that field density tests be taken at a frequency of not less than one (1) test per 5,000 square feet of surface area.

Asphalt Curing Membrane:

Upon completion of intermediate finishing, immediately protect the base course against drying by applying an asphalt curing membrane in accordance with Section 506. Asphalt for the curing membrane should be an emulsified asphalt or an emulsified petroleum resin (EPR-1) complying with Section 1002. Water should comply with Section 1018.01.

Shrinkage Cracking:

Performance evaluations of soil cement mixtures have repeatedly found that the major problem with the process is not strength or durability but shrinkage cracking. The shrinkage of cement treated materials results from the loss of water by drying and from self-desiccation during the hydration of the cement. The factors which influence the severity and amount of cracking may include the amount of cement used, the water content used in the field, the aggregate properties, the adequacy of the curing procedures, weather conditions, the degree of subgrade restraint on the base, and the type and time of placement of the final surfacing.

Shrinkage cracks can result in reflective cracks propagating through the asphaltic wearing course relatively soon after installation since soil-cement mixtures typically generate tensile strengths equal to approximately 20 percent of the compressive strength of the mixture. Consequently, additional cracking may occur from subbase stresses, poor drainage, or slope failures. These cracks are aesthetically unsightly and invariably permit water intrusion of the soil subgrade. This intrusion invariably results in higher maintenance costs and reduces overall pavement life if the cracks are not sealed once they appear and exceed approximately 1/8 inch in width.

As a rule, crack propagation may be significantly reduced by delaying placement of the hot-mixed asphalt (HMA) surface. This concept could involve placing a chip seal on the cured section and the final HMA surface two to four months later.

As an option, the owner or contractor may consider micro-cracking (or pre-cracking) the cement-treated soils. This process consists of making a maximum of four passes of a steel wheel vibratory roller applied two to four days after finishing. The goal of micro-cracking is to form a network of fine cracks and prevent wider, more severe cracks from forming.

Base Course Aggregates:

If a stone base is preferred, the existing soils should be undercut to allow for the placement of the minimum aggregate thicknesses contained in the Minimum Pavement Recommendations chart herein. Stone should consist of 100 percent stone meeting the gradation and plasticity requirements of Item 1003.03(b), and Recycled Portland Cement Concrete should consist of crushed Portland cement concrete meeting the gradation and plasticity requirements of Item 1003.03(c). The materials should be compacted to 95 percent of the maximum density defined by the Modified Proctor (DOTD TR418, Method G).

Prior to the addition of the stone, consideration could be given to placing an optional layer of Tensar TriAx TX 140 or approved equal on top of the subgrade. If installed in accordance with manufacturers recommendations, this product will add stiffness and rigidity below the stone, and will greatly reduce subgrade fatigue and prevent potholing.

Asphaltic Concrete Surfacing:

The asphaltic concrete mixture should be furnished and constructed in accordance with Section 502 – Table 6. Field density results should be based on the Theoretical Maximum Specific Gravity in accordance with DOTD TR 327. Minimum density requirements should be a minimum of 92.0 percent for all areas of the lot. Placement and processes should follow the general guidelines set forth in Sections 502 and 503.

Soils Beneath Rigid Pavements:

The existing soils are considered Usable beneath rigid pavements. Additional soils required to achieve the design grades should consist of Select Soils having a Liquid Limit (LL) equal to or less than 35, a Plasticity Index of (PI) greater than 15, and an organic content less than five (5) percent.

Portland Cement Concrete:

Portland cement concrete for all entrances and drives should be a Type B or D Pavement in accordance with the general guidelines set forth in Table 901-3 of Section 901.11. The mixture should achieve a minimum compressive strength of 4,000 psi at 28 days, and be designed with an air content between two (2) and seven (7) percent. Hot and cold weather limitation should be followed. The design of steel reinforcement should be in accordance with local or accepted codes.

If desired, the design team may substitute a Class A mix in accordance with the 2006 DOTD SSFRB specifications. The mixture should meet the previously mention air-entrainment requirements, and generate a minimum compressive strength of 3,500 psi in 28 days.

Proper finishing of concrete pavement requires appropriate construction joints to reduce the potential for cracking. Construction joints (weakened planes) should be designed in accordance with current Portland Cement Association guidelines. It is recommended that such weakened plane joints be spaced no more than 15' c-c, or as specified by the structural engineer. The depth of such joints should be 1/3 of the pavement thickness. The joints should be cut as soon as the concrete will support the machinery. Joints should be sealed to reduce the potential for water infiltration into pavement joints and subsequent infiltration into the supporting soils.

Construction Considerations:

Excessive movement should not occur if customary measures are taken to minimize moisture variations beneath the structure to preclude loss of shear strength of foundation soils. Proper surface drainage should be maintained, and landscape irrigation systems should be located and operated in a manner to minimize wetting of building foundations. Positive drainage away from the building should be provided at all times, including during construction. If positive drainage is not provided, water will pond around or below the building and excessive total and differential movements may occur.

Secondary Design Considerations:

The following information has been assimilated after examination of numerous problems dealing with soil strata throughout Louisiana. It is presented here for implementation by others. If these features are not incorporated, then performance of the structure may be "**at-risk**".

1. Roof drainage should be **routed via pipe or a hard surface at least 5 feet from the structure.**
2. The **depth of frost penetration** in the vicinity of the project site is estimated to be approximately six inches.
3. Pavements, sidewalks, and the general ground surface should be sloped away from the structure on all sides. Water must not be allowed to pond within 5 feet of the building.
4. Backfill for utility lines should be compacted to at least 95 percent of the standard compaction test (ASTM D-698).
5. Surficial soils of the type encountered at this site are subject to erosion. Therefore, unpaved areas should be protected from erosion by the establishment of a good vegetation cover.
6. Clayey fill has been specified for select fill to reduce the potential migration of water beneath the proposed establishment. Drainage details must focus on routing water away from the structure. Excessive water intrusion can produce undesirable latent vertical movement.
7. Landscaping elements, including irrigation systems must not be allowed to introduce excess water to the structure subgrade. Monitor irrigation controls frequently and adjust to avoid over-watering of plants positioned in close proximity to the structure.

Safety Considerations:

Prior to the commencement of construction, the owner and the contractor should make themselves aware of and become familiar with applicable local, state, and federal safety regulations, including the current Occupational Safety and Health Association (OSHA) Excavation and Trench Safety Standards. Construction site safety generally is the sole responsibility of the contractor, who shall also be solely responsible for the means, methods, and sequencing of construction operations. We are providing this information solely as a service to our client. Under no circumstances should the information provided herein be construed that GTL is assuming responsibility for construction site safety of the contractor's activities. Such responsibility is not being implied and should not be inferred.

Worker Safety - Excavations and Slopes:

After excavating, footings should be inspected and concrete placed as quickly as possible to avoid exposure of the footing bottoms to wetting and drying. If it is required that footing excavations be left open for more than one (1) day, they should be protected to reduce evaporation or entry of moisture. Adequate protection against sloughing of soil should be provided for workers and inspectors entering the footing excavations and undercut areas.

contractor should be aware that slope height, slope inclination, or excavation depths (including utility trench excavations) should in no case exceed those specified in local, state, or federal safety regulations, e.g., OSHA Standards for Excavations, Title 29, Part 1926, successor regulations as well as other building code requirements. Such regulations are strictly enforced and, if not followed, the owner, contractor, and earthwork and utility subcontractors could be liable for substantial penalties.

Drainage:

Water should not be allowed to collect near the foundations, floor slab or pavement areas of the project either during or after construction. Undercut or excavated areas should be sloped toward a sump area to facilitate removal of any collected groundwater or surface runoff. Proper drainage should be provided by sloping the ground surface away from the structure.

Weather Considerations:

The soils encountered in the surficial zone at this site are expected to be relatively sensitive to disturbances caused by construction traffic when wet. The contractor should be aware of the importance of proper maintenance of surface drainage. Depending on weather-related ground conditions, contractor's maintenance of drainage during construction, and other factors, some difficulty may be encountered by the contractor in achieving compaction on initial lifts of fill placed on loose or soft subgrade. This will be exacerbated by wet weather, particularly if the contractor allows surface drainage to enter and pond in the excavations.

Fine-grained soils are expected to be relatively sensitive to disturbances caused by construction traffic and to changes in moisture content. During wet weather periods, increases in the moisture content of the soil can cause significant reduction in the soil strength and support characteristics. In addition, soil which becomes wet may be slow to dry and thus significantly retard the progress of grading and compaction activities. It will, therefore, be advantageous to perform earthwork and foundation construction activities during dry weather. Earthwork activities performed during cooler, wetter months may certainly offer more difficulties than if performed during warmer, drier periods.

If construction is performed during wet conditions, work platforms can be created for earthwork by mixing fly ash, hydrated lime, cement, or combinations of these additives. Quick lime may also be used in areas where dusting is of concern, if proper worker safety considerations are observed. Pumping subgrades are possible at the site and it is recommended that bid documents incorporate this possibility into the bid schedule.

The use of geotextiles and geogrids may be warranted in situations where the subgrade is very wet and highly unstable, if such use is necessary to maintain a mandatory construction schedule during wet weather.

Groundwater Control:

Due to potential variations in groundwater levels, difficulty during excavation and construction of the proposed foundation is possible. Shallow groundwater was not encountered at this site. However, it is reasonable to anticipate that groundwater conditions may vary as noted previously. It is suggested that contract documents address the need for maintaining controls to preclude water from draining into excavations. Some dewatering through shaping of work areas to shed water, and construction of temporary ditches with sumps and pumping may be necessary to remove the loose soils and allow placement of imported select fill in a dry manner. Excavated soils intended for re-use as select fill may require special methods in order to dry the soil to a suitable moisture content prior to re-placing the soil as select fill.

Protection of Work:

Subgrade areas, base courses, and lifts of fill that have been successfully moisture conditioned, processed, and compacted in lifts to the required density, successfully proof-rolled, and approved must be protected from changes in moisture and other influences. Satisfactorily completed areas may be adversely affected by prolonged exposure to dry weather, precipitation, equipment traffic, or by excavations and uncontrolled backfilling for utilities, and other disturbances rendering such areas unsatisfactory. Such areas should be reworked prior to continuing with subsequent construction.

Geotechnical Risk:

The concept of risk is an important aspect of the geotechnical evaluation. The primary reason for this is that the analytical methods used to develop geotechnical recommendations do not comprise an exact science. The analytical tools which geotechnical engineers use are generally empirical and must be used in conjunction with engineering judgment and experience. Therefore, the solutions and recommendations presented in the geotechnical evaluation should not be considered risk-free and, more importantly, are not a guarantee that the interaction between the soils and the proposed structure will perform as planned. The engineering recommendations presented in the preceding sections constitutes GTL's professional estimate of those measures that are necessary for the proposed structure to perform according to the proposed design based on the information generated and referenced during this evaluation, and GTL's experience in working with these conditions.

Limitations:

The exploration and analysis of the conditions reported herein are considered sufficient in detail and scope to form a reasonable basis for the pavement and foundation design. The recommendations submitted are based on the available soil information and preliminary design details furnished for the proposed project. Any revision of the plans for the proposed facility from those enumerated in this report should be brought to our attention so that we may determine if changes in the foundation recommendations are required. If deviations from the noted subsurface conditions are encountered during construction, GTL should be retained to determine if changes in foundation recommendations are required. If GTL is not retained to perform these functions, we will not be responsible for the performance of the structure.

The findings, recommendations, specifications, or professional advice contained herein have been made after being prepared in accordance with generally accepted professional engineering practice in the fields of foundation engineering, soil mechanics, and engineering geology. No other warranties are implied or expressed.

The scope of services did not include any environmental assessment for the presence or absence of wetlands or hazardous or toxic materials in the soil, surface water, groundwater, or air, on or below or around this site. Any statements in this report or on the boring logs regarding odors, colors, or unusual or suspicious items or conditions are strictly for the information of the client. Prior to purchase or development of this site, an environmental assessment is advisable.

The scope of services did not include a geologic investigation to address any faults, large scale subsidence, or other macro geologic features not specifically addressed in this report or the agreement between GTL and the client.

This report has been prepared for the exclusive use of our client for the specific application to the referenced project. GTL cannot be responsible for interpretations, opinions, or recommendations made by others based on the data contained in this report.

This report was prepared for design purposes only and may not be sufficient for purposes of preparing an accurate bid for construction. Contractors reviewing this report are advised that the discussions and recommendations contained herein were provided exclusively to and for use by the project owner.

END OF REPORT TEXT

SEE FOLLOWING APPENDIX w/BORING LOGS & TEST RESULTS

APPENDIX A

FIELD AND LABORATORY PROCEDURES

Field and Laboratory Procedures
Verda Elementary School
New Administration Building and Site Improvements
Montgomery, Grant Parish, Louisiana
Job Number 25005 I CSW
Report Number 08-25-078

I. Field Operations:

Subsurface conditions were evaluated by advancing ten (10) intermittent sample borings on August 5, 2025 within the project area. The boring locations were selected and staked in the field by representatives of Geotechnical Testing Laboratory, Inc. An illustration of the approximate boring locations is provided on the Plan of Borings herein. Descriptive terms and symbols used on the Boring Logs are in accordance with the Unified Soil Classification System (USCS).

A truck-mounted rotary drilling rig was used to make the test borings. Intermittent undisturbed samples were obtained in the following manner.

Standard penetration tests were performed in accordance with ASTM D-1586 procedures. This test is conducted by recording the number of blows required for a 140-pound hammer falling 30 inches to drive a split-spoon sampler eighteen inches into the substrata. Depths at which split-spoon samples were taken are indicated by two crossed lines in the "Samples" column on the Log of Boring. The number of blows required to drive the sampler for each 6-inch increment were recorded. The penetration resistance is the number of blows required to drive the split-spoon sampler the final 12-inches of penetration. Information related to the penetration resistance is presented under the "Field Data" heading of the Log of Boring as the Standard Penetration (Blows/Foot). These samples were visually examined, logged, and packaged for transport to our laboratory.

The presence of ground water was monitored during drilling operations. Initial water seepage readings are provided under "Groundwater Information" in the right hand column of the Log of Boring. Upon boring completion, water levels were allowed to rise and stabilize for several minutes prior to final water readings. These readings are found under "Groundwater Information". Soil sloughing from the walls of the boring are also recorded here as depth of cave-in.

II. Laboratory Studies:

Upon return to the laboratory, all samples were visually examined and representative samples were selected for testing. Tests were performed on selected samples recovered from the test borings to verify classification and to determine pertinent engineering properties of the substrata. Individual test and ASTM designations are provided in the following table:

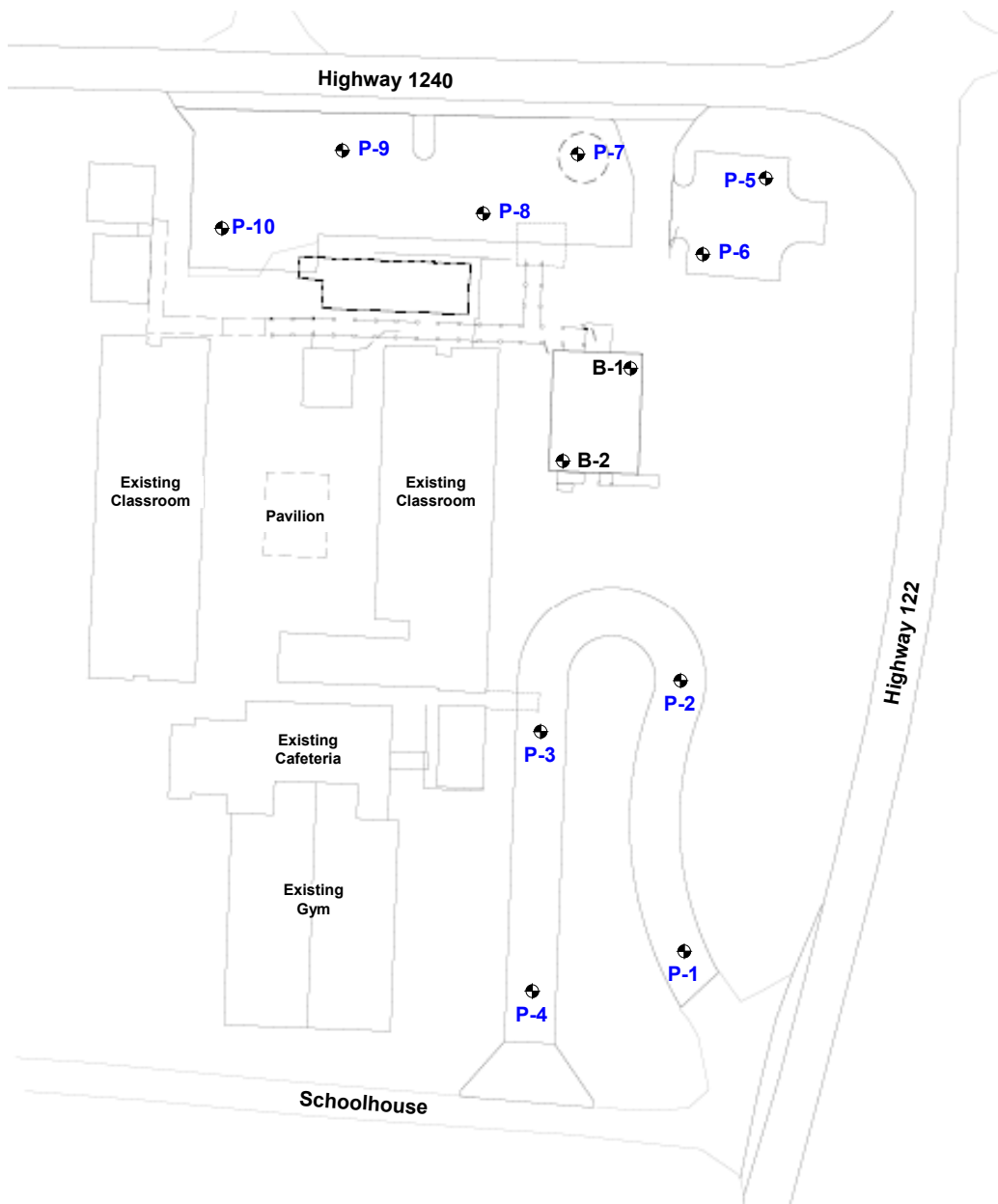
Test	ASTM Designations
Atterberg Limits	ASTM D 4318
Moisture Content	ASTM D 2216
Percent Minus #200	ASTM D 1140
Hydrometer Analysis	ASTM D422

Results for soil classifications are located on the Log of Boring in their respective columns under "Laboratory Data."

Samples obtained during our field studies and not consumed by laboratory testing procedures will be retained free of charge for a period of 30 days. Arrangements for storage beyond that period of time must be made in writing to ***Geotechnical Testing Laboratory, Inc.***

APPENDIX B

PLAN OF BORINGS



This is a generalized drawing intended to locate the borings relative to the existing site plan.

PLAN OF BORINGS

PROJECT

Verda Elementary School, New Administration Building & Site Improvements, Montgomery, LA

SCALE

Not to Scale

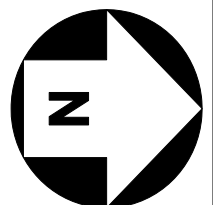
DATE

8/12/2025

FILENAME

07-25-078

Grant Parish School Board



APPENDIX C

BORING LOGS AND SOIL CLASSIFICATION CHART

LOG OF BORING B- 1

SHEET 1 of 1



Geotechnical Testing Laboratory, Inc.
 226 Parkwood Drive
 Alexandria, LA 71301
 Telephone: (318) 443-7429

CLIENT: **Grant Parish School Board**
 PROJECT: **Verda Elementary School**
 LOCATION: **Verda, Grant Parish, Louisiana**
 FILE NO.: **08-25-078**

DRILL DATE: **8/5/25**

DRILLING METHOD(S):
CME 45B, 4.5" I.D. Hollow Stem Auger

DRILLER: **K. Book** CHECKED BY: **K. Gorsha**

GROUNDWATER INFORMATION:
No Water Seepage Noted While Drilling
No Water Observed Upon Completion
Boring Walls Remained Open

SURFACE ELEVATION: **Not Determined**

DESCRIPTION OF STRATUM

Medium Dense Brown Silty SAND (SM) 1.0'

Loose Red Clayey SAND (SC)

- medium dense @ 3.5 feet

8.5'

Medium Dense Red Silty SAND (SM)

- reddish yellow @ 14.0 feet

- dense @ 19.0 feet

20.0'

Boring Terminated @ 20.0 Feet

N - STANDARD PENETRATION TEST RESISTANCE
 P - POCKET PENETROMETER RESISTANCE

NOTES:
 See Plan of Borings for Location
 Stratification Is Not Exact

GTL LOG - LOG A GNNL01.GDT - 8/11/25 10:14 - K:\GINT PROJECTS\2025 JOBS\08-25-078.GPJ

LOG OF BORING B- 2

SHEET 1 of 1



Geotechnical Testing Laboratory, Inc.
226 Parkwood Drive
Alexandria, LA 71301
Telephone: (318) 443-7429

CLIENT: Grant Parish School Board
PROJECT: Verda Elementary School
LOCATION: Verda, Grant Parish, Louisiana
FILE NO.: 08-25-078

DRILL DATE: 8/5/25

DRILLING METHOD(S):
CME 45B, 4.5" I.D. Hollow Stem Auger

DRILLER: **K. Book** CHECKED BY: **K. Gorsha**

GROUNDWATER INFORMATION:
No Water Seepage Noted While Drilling
No Water Observed Upon Completion
Boring Walls Remained Open

SURFACE ELEVATION: **Not Determined**

DESCRIPTION OF STRATUM

Loose Red, Slightly Clayey, Silty SAND (SC-SM)

3.0'

Medium Dense Red Clayey SAND (SC)

8.5'

Medium Dense Red Silty SAND (SM)

- loose @ 14.0 feet

- medium dense @ 19.0 feet

20.0'

Boring Terminated @ 20.0 Feet

N - STANDARD PENETRATION TEST RESISTANCE
P - POCKET PENETROMETER RESISTANCE

NOTES:
See Plan of Borings for Location
Stratification Is Not Exact

GTL LOG - LOG A GNNL01.GDT - 8/11/25 10:14 - K:\GINT PROJECTS\2025 JOBS\08-25-078.GPJ

LOG OF BORING P- 1

SHEET 1 of 1



Geotechnical Testing Laboratory, Inc.
226 Parkwood Drive
Alexandria, LA 71301
Telephone: (318) 443-7429

CLIENT: **Grant Parish School Board**
PROJECT: **Verda Elementary School**
LOCATION: **Verda, Grant Parish, Louisiana**
FILE NO.: **08-25-078**

DRILL DATE: 8/5/25

		FIELD DATA		LABORATORY DATA						DRILLING METHOD(S): CME 45B, 4.5" I.D. Hollow Stem Auger	
SOIL SYMBOL	DEPTH (FT)	SAMPLES	N: BLOWS/FT P: TONS/SQ FT	MOISTURE CONTENT (%)	ATTEBERG LIMITS			MINUS NO. 200 SIEVE (%)	DRY DENSITY (Lbs./Cu.Ft.)	COMPRESSIVE STRENGTH (Lb./Sq. Ft.)	DRILLER: K. Book CHECKED BY: K. Gorsha
					LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX				GROUNDWATER INFORMATION: No Water Seepage Noted While Drilling No Water Observed Upon Completion Boring Walls Remained Open
LL	PL	PI	SURFACE ELEVATION: Not Determined								
DESCRIPTION OF STRATUM											
	1			7	25	18	7	39			± 1.50" of Surface Gravel over Red, Slightly Clayey, Silty SAND (SC-SM) 3.0'
	2			13							
	3										Red Clayey SAND (SC) 5.0'
	4			12	28	18	10	48			
	5										
Boring Terminated @ 5.0 Feet											
N - STANDARD PENETRATION TEST RESISTANCE P - POCKET PENETROMETER RESISTANCE											NOTES: See Plan of Borings for Location Stratification Is Not Exact

LOG OF BORING P- 2

SHEET 1 of 1



Geotechnical Testing Laboratory, Inc.
226 Parkwood Drive
Alexandria, LA 71301
Telephone: (318) 443-7429

CLIENT: **Grant Parish School Board**
PROJECT: **Verda Elementary School**
LOCATION: **Verda, Grant Parish, Louisiana**
FILE NO.: **08-25-078**

DRILL DATE: 8/5/25

DRILLING METHOD(S):
CME 45B, 4.5" I.D. Hollow Stem Auger

DRILLER: **K. Book** CHECKED BY: **K. Gorsha**

GROUNDWATER INFORMATION:
No Water Seepage Noted While Drilling
No Water Observed Upon Completion
Boring Walls Remained Open

SURFACE ELEVATION: Not Determined

DESCRIPTION OF STRATUM

± 1.00" of Asphalt Surfacing over Red, Slightly Clayey, Silty SAND (SC-SM)

5.0'

Boring Terminated @ 5.0 Feet

NOTES:
See Plan of Borings for Location
Stratification Is Not Exact

N - STANDARD PENETRATION TEST RESISTANCE
P - POCKET PENETROMETER RESISTANCE

GTL LOG - LOG A GNNL01.GDT - 8/11/25 10:14 - K:\GINT PROJECTS\2025 JOBS\08-25-078.GPJ

LOG OF BORING P- 3

SHEET 1 of 1



Geotechnical Testing Laboratory, Inc.
 226 Parkwood Drive
 Alexandria, LA 71301
 Telephone: (318) 443-7429

CLIENT: **Grant Parish School Board**
 PROJECT: **Verda Elementary School**
 LOCATION: **Verda, Grant Parish, Louisiana**
 FILE NO.: **08-25-078**

DRILL DATE: **8/5/25**

FIELD DATA				LABORATORY DATA						DRILLING METHOD(S): CME 45B, 4.5" I.D. Hollow Stem Auger	
SOIL SYMBOL	DEPTH (FT)	SAMPLES	N: BLOWS/FT P: TONS/SQ FT	MOISTURE CONTENT (%)	ATTERBERG LIMITS			MINUS NO. 200 SIEVE (%)	DRY DENSITY (Lbs./Cu.Ft.)	COMPRESSIVE STRENGTH (Lb./Sq. Ft.)	DRILLER: K. Book CHECKED BY: K. Gorsha GROUNDWATER INFORMATION: No Water Seepage Noted While Drilling No Water Observed Upon Completion Boring Walls Remained Open SURFACE ELEVATION: Not Determined
					LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX				
					LL	PL	PI				
	1			11	22	17	5	47			DESCRIPTION OF STRATUM ± 1.00" of Surface Gravel over Brown & Gray, Slightly Clayey, Silty SAND (SC-SM) - SILT 26%; SAND 53%; CLAY 21% - red @ 3.0 feet 5.0'
	2			13							
	3										
	4			13							
	5										
Boring Terminated @ 5.0 Feet											

N - STANDARD PENETRATION TEST RESISTANCE
 P - POCKET PENETROMETER RESISTANCE

NOTES:
 See Plan of Borings for Location
 Stratification Is Not Exact

LOG OF BORING P- 4

SHEET 1 of 1



Geotechnical Testing Laboratory, Inc.
226 Parkwood Drive
Alexandria, LA 71301
Telephone: (318) 443-7429

CLIENT: **Grant Parish School Board**
PROJECT: **Verda Elementary School**
LOCATION: **Verda, Grant Parish, Louisiana**
FILE NO.: **08-25-078**

DRILL DATE: 8/5/25

FIELD DATA		LABORATORY DATA							DRILLING METHOD(S): CME 45B, 4.5" I.D. Hollow Stem Auger		
SOIL SYMBOL	DEPTH (FT)	SAMPLES	N: BLOWS/FT P: TONS/SQ FT	MOISTURE CONTENT (%)	ATTERBERG LIMITS			MINUS NO. 200 SIEVE (%)	DRY DENSITY (Lbs./Cu.Ft.)	COMPRESSIVE STRENGTH (Lb./Sq. Ft.)	DRILLER: K. Book CHECKED BY: K. Gorsha
					LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX				GROUNDWATER INFORMATION: No Water Seepage Noted While Drilling No Water Observed Upon Completion Boring Walls Remained Open
					LL	PL	PI				
DESCRIPTION OF STRATUM											
	1			10	22	18	4	49			Red, Slightly Clayey, Silty SAND (SC-SM) 5.0'
	2			10							
	3										
	4			9							
	5										
Boring Terminated @ 5.0 Feet											
NOTES: See Plan of Borings for Location Stratification Is Not Exact											

LOG OF BORING P- 5

SHEET 1 of 1



Geotechnical Testing Laboratory, Inc.
226 Parkwood Drive
Alexandria, LA 71301
Telephone: (318) 443-7429

CLIENT: Grant Parish School Board
PROJECT: Verda Elementary School
LOCATION: Verda, Grant Parish, Louisiana
FILE NO.: 08-25-078

DRILL DATE: 8/5/25

		FIELD DATA		LABORATORY DATA							DRILLING METHOD(S): CME 45B, 4.5" I.D. Hollow Stem Auger	
SOIL SYMBOL	DEPTH (FT)	SAMPLES	N: BLOWS/FT P: TONS/SQ FT	MOISTURE CONTENT (%)	ATTERBERG LIMITS			MINUS NO. 200 SIEVE (%)	DRY DENSITY (Lbs./Cu.Ft.)	COMPRESSIVE STRENGTH (Lb./Sq. Ft.)	DRILLER: K. Book	CHECKED BY: K. Gorsha
					LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX				GROUNDWATER INFORMATION:	
											No Water Seepage Noted While Drilling No Water Observed Upon Completion Boring Walls Remained Open	
											SURFACE ELEVATION: Not Determined	
DESCRIPTION OF STRATUM												
	1			8	NP	NP	NP	30			Brown Silty Sand (SM)	
	2			11	21	16	5	34			Brown, Slightly Clayey, Silty SAND (SC-SM)	
	3											
	4			10								
	5											
Boring Terminated @ 5.0 Feet												
N - STANDARD PENETRATION TEST RESISTANCE P - POCKET PENETROMETER RESISTANCE											NOTES: See Plan of Borings for Location Stratification Is Not Exact	

LOG OF BORING P- 6

SHEET 1 of 1



Geotechnical Testing Laboratory, Inc.
226 Parkwood Drive
Alexandria, LA 71301
Telephone: (318) 443-7429

CLIENT: Grant Parish School Board
PROJECT: Verda Elementary School
LOCATION: Verda, Grant Parish, Louisiana
FILE NO.: 08-25-078

DRILL DATE: 8/5/25

		FIELD DATA			LABORATORY DATA						DRILLING METHOD(S): CME 45B, 4.5" I.D. Hollow Stem Auger		
SOIL SYMBOL	DEPTH (FT)	SAMPLES	N: BLOWS/FT P: TONS/SQ FT	MOISTURE CONTENT (%)	ATTEMBERG LIMITS			MINUS NO. 200 SIEVE (%)	DRY DENSITY (Lbs./Cu.Ft.)	COMPRESSIVE STRENGTH (Lb./Sq. Ft.)	DRILLER: K. Book	CHECKED BY: K. Gorsha	
					LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX				GROUNDWATER INFORMATION:		
											No Water Seepage Noted While Drilling No Water Observed Upon Completion Boring Walls Remained Open		
											SURFACE ELEVATION: Not Determined		
DESCRIPTION OF STRATUM													
	1			10	NP	NP	NP	32			Reddish Brown Silty SAND (SM) - SILT 20%; SAND 68%; CLAY 12% 1.0'		
	2			12	31	20	11	46			Reddish Brown Clayey SAND (SC)		
	3												
	4			13									
	5										Boring Terminated @ 5.0 Feet		
												NOTES: See Plan of Borings for Location Stratification Is Not Exact	
N - STANDARD PENETRATION TEST RESISTANCE P - POCKET PENETROMETER RESISTANCE													

LOG OF BORING P- 7

SHEET 1 of 1



Geotechnical Testing Laboratory, Inc.
226 Parkwood Drive
Alexandria, LA 71301
Telephone: (318) 443-7429

CLIENT: Grant Parish School Board
PROJECT: Verda Elementary School
LOCATION: Verda, Grant Parish, Louisiana
FILE NO.: 08-25-078

DRILL DATE: 8/5/25

FIELD DATA		LABORATORY DATA							DRILLING METHOD(S): CME 45B, 4.5" I.D. Hollow Stem Auger			
SOIL SYMBOL	DEPTH (FT)	SAMPLES	N: BLOWS/FT P: TONS/SQ FT	MOISTURE CONTENT (%)	ATTERBERG LIMITS			MINUS NO. 200 SIEVE (%)	DRY DENSITY (Lbs./Cu.Ft.)	COMPRESSIVE STRENGTH (Lb./Sq. Ft.)	DRILLER: K. Book	CHECKED BY: K. Gorsha
					LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX				GROUNDWATER INFORMATION: No Water Seepage Noted While Drilling No Water Observed Upon Completion Boring Walls Remained Open	
					LL	PL	PI				SURFACE ELEVATION: Not Determined	
					DESCRIPTION OF STRATUM							
	1			13	24	18	6	58			Brown, Slightly Clayey, Silty SAND (SC-SM) 1.0'	
	2			11							Red Clayey SAND (SC)	
	3											
	4			10								
	5										5.0'	
Boring Terminated @ 5.0 Feet												
NOTES: See Plan of Borings for Location Stratification Is Not Exact												
N - STANDARD PENETRATION TEST RESISTANCE P - POCKET PENETROMETER RESISTANCE												

LOG OF BORING P- 8

SHEET 1 of 1



Geotechnical Testing Laboratory, Inc.
226 Parkwood Drive
Alexandria, LA 71301
Telephone: (318) 443-7429

CLIENT: Grant Parish School Board
PROJECT: Verda Elementary School
LOCATION: Verda, Grant Parish, Louisiana
FILE NO.: 08-25-078

DRILL DATE: 8/5/25

FIELD DATA				LABORATORY DATA						DRILLING METHOD(S): CME 45B, 4.5" I.D. Hollow Stem Auger	
SOIL SYMBOL	DEPTH (FT)	SAMPLES	N: BLOWS/FT P: TONS/SQ FT	MOISTURE CONTENT (%)	ATTERBERG LIMITS			MINUS NO. 200 SIEVE (%)	DRY DENSITY (Lbs./Cu.Ft.)	COMPRESSIVE STRENGTH (Lb./Sq. Ft.)	DRILLER: K. Book CHECKED BY: K. Gorsha GROUNDWATER INFORMATION: No Water Seepage Noted While Drilling No Water Observed Upon Completion Boring Walls Remained Open SURFACE ELEVATION: Not Determined
					LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX				
					LL	PL	PI				
	1			11	29	19	10	46			Red Clayey SAND (SC) - SILT 18%; SAND 54%; CLAY 28% 5.0'
	2			11							
	3										
	4			11							
	5										
Boring Terminated @ 5.0 Feet											

N - STANDARD PENETRATION TEST RESISTANCE
P - POCKET PENETROMETER RESISTANCE

NOTES:
See Plan of Borings for Location
Stratification Is Not Exact

LOG OF BORING P- 9

SHEET 1 of 1



Geotechnical Testing Laboratory, Inc.
 226 Parkwood Drive
 Alexandria, LA 71301
 Telephone: (318) 443-7429

CLIENT: **Grant Parish School Board**
 PROJECT: **Verda Elementary School**
 LOCATION: **Verda, Grant Parish, Louisiana**
 FILE NO.: **08-25-078**

DRILL DATE: **8/5/25**

FIELD DATA				LABORATORY DATA							DRILLING METHOD(S): CME 45B, 4.5" I.D. Hollow Stem Auger	
SOIL SYMBOL	DEPTH (FT)	SAMPLES	N: BLOWS/FT P: TONS/SQ FT	MOISTURE CONTENT (%)	ATTERBERG LIMITS			MINUS NO. 200 SIEVE (%)	DRY DENSITY (Lbs./Cu.Ft.)	COMPRESSIVE STRENGTH (Lb./Sq. Ft.)	DRILLER: K. Book CHECKED BY: K. Gorsha GROUNDWATER INFORMATION: No Water Seepage Noted While Drilling No Water Observed Upon Completion Boring Walls Remained Open SURFACE ELEVATION: Not Determined	
					LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX					
					LL	PL	PI					
											DESCRIPTION OF STRATUM	
	1			10	26	17	9	42			Red Clayey SAND (SC)	
	2			10								
	3											
	4			13								
	5										5.0'	
											Boring Terminated @ 5.0 Feet	
N - STANDARD PENETRATION TEST RESISTANCE P - POCKET PENETROMETER RESISTANCE											NOTES: See Plan of Borings for Location Stratification Is Not Exact	

LOG OF BORING P-10

SHEET 1 of 1



Geotechnical Testing Laboratory, Inc.
 226 Parkwood Drive
 Alexandria, LA 71301
 Telephone: (318) 443-7429

CLIENT: **Grant Parish School Board**
 PROJECT: **Verda Elementary School**
 LOCATION: **Verda, Grant Parish, Louisiana**
 FILE NO.: **08-25-078**

DRILL DATE: **8/5/25**

FIELD DATA		LABORATORY DATA							DRILLING METHOD(S): CME 45B, 4.5" I.D. Hollow Stem Auger			
SOIL SYMBOL	DEPTH (FT)	SAMPLES	N: BLOWS/FT P: TONS/SQ FT	MOISTURE CONTENT (%)	ATTEMBERG LIMITS			MINUS NO. 200 SIEVE (%)	DRY DENSITY (Lbs./Cu.Ft.)	COMPRESSIVE STRENGTH (Lb./Sq. Ft.)	DRILLER: K. Book	CHECKED BY: K. Gorsha
					LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX				GROUNDWATER INFORMATION: No Water Seepage Noted While Drilling No Water Observed Upon Completion Boring Walls Remained Open	
					LL	PL	PI				SURFACE ELEVATION: Not Determined	
					DESCRIPTION OF STRATUM							
	1			8	NP	NP	NP	28			Reddish Brown Silty SAND (SM) 1.0'	
	2			12	22	16	6	36			Reddish Brown, Slightly Clayey, Silty SAND (SM)	
	3											
	4			11								
	5											Boring Terminated @ 5.0 Feet
N - STANDARD PENETRATION TEST RESISTANCE P - POCKET PENETROMETER RESISTANCE											NOTES: See Plan of Borings for Location Stratification Is Not Exact	

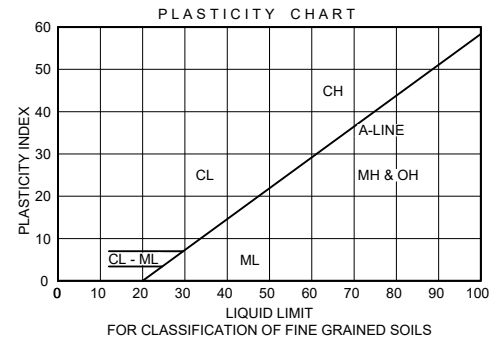
N - STANDARD PENETRATION TEST RESISTANCE
 P - POCKET PENETROMETER RESISTANCE

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			SYMBOL & LETTER		DESCRIPTION	
COARSE-GRAINED SOILS More than half of material larger than No. 200 sieve size	GRAVELS More than half of coarse fraction larger than No.4 sieve size	Clean Gravels (Little or no fines)		GW	WELL GRADED GRAVEL, GRAVEL-SAND MIXTURE	
				GP	POORLY GRADED GRAVEL, GRAVEL-SAND MIXTURE	
		Gravels with fines (Appreciable amount of fines)		GM	SILTY GRAVEL, GRAVEL-SAND-SILT MIXTURE	
				GC	CLAYEY GRAVEL, GRAVEL-SAND-CLAY MIXTURE	
	SANDS More than half of coarse fraction smaller than No.4 sieve size	Clean Sands (Little or no fines)		SW	WELL GRADED SAND, GRAVELLY SAND	
				SP	POORLY GRADED SAND, GRAVELLY SAND	
		Sands with fines (Appreciable amount of fines)		SM	SILTY SAND, SAND-SILT MIXTURE	
				SP-SM	SLIGHTLY SILTY SAND	
				SC	CLAYEY SAND, SAND-CLAY MIXTURE	
				ML	SILT WITH LITTLE OR NO PLASTICITY	
FINE-GRAINED SOILS More than half of material smaller than No. 200 sieve size	SILTS AND CLAYS Liquid limit less than 50			ML	CLAYEY SILT, SILT WITH SLIGHT TO MEDIUM PLASTICITY	
				ML	SANDY SILT	
				CL	SILTY CLAY, LOW TO MEDIUM PLASTICITY	
				CL	SANDY CLAY, LOW TO MEDIUM PLASTICITY (30% TO 50% SAND)	
				MH	SILT, FINE SANDY OR SILTY SOIL WITH HIGH PLASTICITY	
	SILTS AND CLAYS Liquid limit greater than 50			CH	CLAY, HIGH PLASTICITY	
				OH	ORGANIC CLAY OF MEDIUM TO HIGH PLASTICITY	
		HIGHLY ORGANIC SOILS				PT
	SEDEMENTARY ROCK TYPES:				LS	LIMESTONE
					MARL	MARL

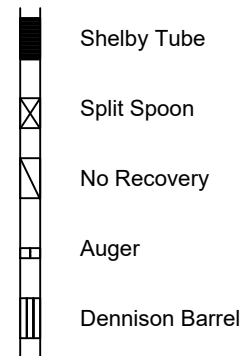
TERMS CHARACTERIZING SOIL STRUCTURE

Slickensided	- Clays with polished and striated planes created as a result of volume changes related to shrinking, swelling and/or changes in overburden pressure.
Fissured	- Clays with a blocky or jointed structure generally created by seasonal shrinking and swelling.
Laminated	- Composed of thin alternating layers of varying color and texture.
Calcareous	- Containing appreciable quantities of calcium carbonate.
Parting	- Paper thin (less than 1/8 inch).
Seam	- 1/8 inch to 3 inch thickness.
Layer	- Greater than 3 inches in thickness.



SAMPLE TYPES

(Shown in Sample Column)



DENSITY AND CONSISTENCY

COARSE-GRAINED SOILS		FINE-GRAINED SOILS		
DENSITY	PENETRATION RESISTANCE, N	CONSISTENCY	COHESION Kips/Sq. Ft	PENETRATION RESISTANCE, N
Very loose	0 - 2	Very Soft	<0.25	0 - 2
Loose	4 - 10	Soft	0.25 - 0.50	2 - 4
Medium Dense	11 - 30	Firm	0.50 - 1.00	4 - 8
Dense	31 - 50	Stiff	1.00 - 2.00	8 - 15
Very Dense	>50	Very Stiff	2.00 - 4.00	15 - 30
		Hard	>4.00	>30

PARTICLE SIZE IDENTIFICATION

Cobbles	- Greater than 3 inches
Gravel	- Coarse - 3/4 inch to 3 inches
	Fine - 4.76 mm to 3/4 inch
Sand	- Coarse - 2 mm to 4.76 mm
	Medium - 0.42 mm to 2 mm
	Fine - 0.074 mm to 0.42 mm
Silt & Clay	- Less than 0.074 mm

RELATIVE COMPOSITION

Slightly	5 - 15%
With	16 - 29%
Sandy	30 - 50%
(or gravelly)	

CLASSIFICATION, SYMBOLS AND TERMS USED ON GRAPHICAL BORING LOGS



_____, an agency of the United States government, or an agency, board, commission, or instrumentality of the State of Louisiana or its political subdivisions, including parishes, municipalities and school boards, does hereby designate the following contractor as its agent for the purpose of making sales tax exempt purchases on behalf of the governmental body:

Name of Contractor		
Address		
City	State	ZIP

This designation of agency shall be effective for purchases of component construction materials, taxable services and leases and rentals of tangible personal property for the following named construction project:

Construction Project	Contract Number

This designation and acceptance of agency is effective for the period

Beginning Date (mm/dd/yyyy)	End Date (mm/dd/yyyy)

Purchases for the named project during this period by the designated contractor shall be considered as the legal equivalent of purchases directly by the governmental body. Any materials purchased by this agent shall immediately, upon the vendor’s delivery to the agent, become the property of this government entity. This government entity, as principal, assumes direct liability to the vendor for the payment of any property, services, leases, or rentals made by this designated agent. This agreement does not void or supersede the obligations of any party created under any construction contract related to this project, including specifically any contractual obligation of the construction contractor to submit payment to the vendors of materials or services for the project.

This contractor-agent is not authorized to delegate this purchasing agency to others; separate designations of agency by this governmental entity are required for each contractor or sub-contractor who is to purchase on behalf of this governmental entity. The undersigned hereby certify that this designation is the entirety of the agency designation agreement between them. In order for a purchase for an eligible governmental entity through a designated agent to be eligible for sales tax exemption, the designation of agency must be made, accepted, and disclosed to the vendor before or at the time of the purchase transaction.

Designation of Agency			Acceptance of Agency		
Signature of Authorized Designator		Date (mm/dd/yyyy)	Signature of Contractor or Subcontractor Authorized Acceptor		Date (mm/dd/yyyy)
Name of Authorized Designator			Name of Contractor's or Subcontractor's Acceptor		
Name of Governmental Entity			Name of Contractor		
Address			Address		
City	State	ZIP	City	State	ZIP

This designation of agency form, when properly executed by both the contractor and the governmental entity, shall serve as evidence of the sales tax exempt status that has been conferred onto the contractor. No other exemption certificate form is necessary to claim exemption from sales taxes. The agency agreement evidenced by this sales tax exemption certificate must be implemented at the time of contract execution with the governmental entity. The contract between the governmental entity and his agent must contain provisions to authenticate the conferment of agency.

DIVISION 1 - GENERAL REQUIREMENTS
SECTION 010100 - SUMMARY OF WORK

PART I. PROJECT

PROJECT NAME: **New Administrative Office for Verda Elementary School-Re-Bid**

- A. Owners Name: Grant Parish School Board-Colfax, LA
- B. Architects Name: Barron, Heinberg & Brocato Architects and Engineers.
- C. Generally, the Project consists of the following elements of work as described by the drawings, specifications and bid documents:

Summary of Work:

- 1. New building: A new single-story administrative office building with enclosed area of 2,494 SF and under roof area of 3,296 SF.
- 2. Site Work:
 - a. Site work includes grading, over excavation and placement of engineered fills for a building pad and foundations.
 - b. Site erosion control measures during construction.
 - c. Pavement includes new driveway entrance apron, crushed stone paving, sidewalks, and cutting and patching of existing paving to facilitate new construction.
 - d. New covered walks to connect new building to existing covered walks.
 - e. New chain link fencing and gates are included. Demolition of portions of existing fencing and gates as required to facilitate new construction.
 - f. Underground utilities for water, sewer, electricity, and communications are provided.
 - g. Storm water collection, management and distribution are designed as uniformly sloped surface grading and surface swales and sidewalk drains for positive drainage toward existing open ditches and culverts located at the parish road and state highway right-of-way.
- 3. Building Construction:
 - a. Shallow reinforced concrete footings and slab support building loads and construction for exterior bearing walls, steel columns, driveway canopy and interior partitions.
 - b. Exterior building construction consists of wood framing for exterior walls, interior partitions, and pre-engineered wood truss roof framing. Exterior sheathing and roof deck are exterior grade plywood.
 - c. Exterior wall finishes include brick veneer masonry wainscot, and exterior metal wall panels, metal fascia and Dutch-lap vinyl siding. Roofs are sloped and finished with asphalt shingles. Building soffits are vinyl with venting at the eaves and non-vented at the gables. Aluminum and glass framing provide

entrances and windows on the exterior of the building. Painted galvanized hollow metal doors are provided for rear exit door and mechanical and electrical rooms.

- d. Interior build-out and finishes for floors, base, walls, and ceilings are included. Luxury vinyl tile and rubber base and ceramic tile floor and base are noted for floor finishes. Interior partitions are gypsum board finished and painted, with porcelain tile wainscot at wet areas. Ceilings are suspended acoustical and painted gypsum board. Plastic laminate clad solid core wood doors provide openings to workspaces, offices, and storage areas.

4. Mechanical Plumbing and HVAC:

- a. Plumbing design includes distribution for plumbing, drains and fixtures for drinking fountains, sinks and lavatories, water closets, janitor's sink, and exterior hose bibs. Project includes new sanitary piping and connection to existing campus sewer system at the south side of the site. Hot water heating for handwashing and service sink is provided by a small electric water heater.
- b. Mechanical Design includes Heating, Ventilation and Air Conditioning (HVAC) Systems for interior comfort and humidity control. The building is serviced by two split-system A/C units with electrical heating located in the mechanical equipment room and condensing units located behind the building on a concrete equipment pad. Cooling and heating is distributed to interior building spaces through fixed metal and flexible ductwork to registers and grilles located above the ceilings. Digital thermostats are provided for control of temperature and humidity. Fire dampers are located in ductwork that passes through fire rated construction.

5. Electrical:

- a. New electrical service is provided as shown on Electrical Drawings. Recessed fixtures are located in areas where suspended acoustical ceilings are indicated. Surface-mounted fixtures are located at areas with fire-rated gypsum board ceiling systems and at wet areas.
- b. Project includes exterior lighting of porches, covered walks and gates, and power connections to electric gate controllers at new vehicular gates.
- c. Project includes new campus-wide intercom system.
- d. Project includes provisions for "buzz-in" access control of selected doors and gates and video surveillance of same.

6. IT Communications:

- a. Empty conduits and junction boxes for IT and telephone services will be provided throughout the building with outlets in all occupied and service areas. Underground conduits with pull wires will be provided from a service provider to the locations indicated within the buildings. It will be terminated for a tie-in to Owner provided Rack Mounted Servers and related equipment.
- b. Project includes empty conduit and junction box rough-in provisions to facilitate installation of IT system, access control system and camera system, including floor-to-ceiling plywood telephone/IT panels and concealed junction boxes and conduits routed to above ceilings with pull wires for use by Owner's IT, access control and CCTV vendors.

PART II. CONTRACT DESCRIPTION

A. CONTRACT TYPE:

1. A single prime contract based on a Stipulated Price as described in the Agreement.
- 2. A building permit will be required for the Project.**

PART III. OWNER OCCUPANCY

- A. Schedule the Work to accommodate Owner occupancy.

PART IV. CONTRACTOR USE OF SITE AND PREMISES

- A. Construction Operations: Limited to areas indicated on Drawings.
- B. Do not block or restrict required exits from existing building while existing building is occupied.

PART V. PHASING OF WORK DURING PROJECT CONSTRUCTION PHASE

Managing and sequencing the work schedule is required to minimize interruption of daily operation and to protect the building and its contents from damage during construction.

- B. Any construction work affecting the daily operations and the continuous operations of the facility will need to be coordinated with the owner, especially if there exists a potential for causing an interrupt in any part of the system.
- C. The Owner will assume no liability nor responsibility for any work or damage to the facility occurring within the scope of the project.
- D. The Contractor will maintain the work area in as neat a condition as possible. Scrap materials will be disposed of in the appropriate manner. All materials being used shall be properly secured and protected against damaging weather.
- E. The Contractor is expected to carry all necessary insurance and protection against casualty loss or injury to property or personnel on the site whether they are employees of the Owner or the Contractor.

END OF SECTION 010100

DIVISION 1 - GENERAL REQUIREMENTS
SECTION 010270 - APPLICATIONS FOR PAYMENT

PART I. - GENERAL

A. RELATED DOCUMENTS

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

B. SUMMARY

1. This Section specifies administrative and procedural requirements governing the Contractor's Applications for Payment.
 - a. Coordinate the Schedule of Values and Applications for Payment with the Contractor's Construction Schedule, Submittal Schedule, and List of Subcontracts.

C. SCHEDULE OF VALUES

1. Coordination: Coordinate preparation of the Schedule of Values with preparation of the Contractor's Construction Schedule.
 - a. Correlate line items in the Schedule of Values with other required administrative schedules and forms, including:
 - (1) Contractor's Construction Schedule.
 - (2) Application for Payment forms, including Continuation Sheets.
 - (3) List of subcontractors.
 - (4) Schedule of allowances.
 - (5) Schedule of alternates.
 - (6) List of products.
 - (7) List of principal suppliers and fabricators.
 - (8) Schedule of submittals.
 - b. Submit the Schedule of Values to the Architect at the earliest possible date but no later than 7 days before the date scheduled for submittal of the initial Applications for Payment.
 - c. Subschedules: Where Work is separated into phases requiring separately phased payments, provide subschedules showing values correlated with each phase of payment.
2. Format and Content: Use the Project Manual table of contents as a guide to establish the format for the Schedule of Values. Provide at least one line item for each Specification Section.
 - a. Identification: Include the following Project identification on the Schedule of Values:
 - (1) Project name and location.
 - (2) Name of the Architect.
 - (3) Project number.
 - (4) Contractor's name and address.
 - (5) Date of submittal.
 - b. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
 - (1) Related Specification Section or Division.
 - (2) Description of Work.
 - (3) Name of subcontractor.
 - (4) Name of manufacturer or fabricator.

- (5) Name of supplier.
- (6) Change Orders (numbers) that affect value.
- (7) Dollar value.

(a) Percentage of Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.

- c. Provide a breakdown of the Contract Sum in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Break principal subcontract amounts down into several line items.
- d. Round amounts to nearest whole dollar; the total shall equal the Contract Sum.
- e. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment, purchased or fabricated and stored, but not yet installed.

(1) Differentiate between items stored on-site and items stored off-site. Include requirements for insurance and bonded warehousing, if required.

- f. Provide separate line items on the Schedule of Values for initial cost of the materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
- g. Unit-Cost Allowances: Show the line-item value of unit-cost allowances, as a product of the unit cost, multiplied by the measured quantity. Estimate quantities from the best indication in the Contract Documents.
- h. Margins of Cost: Show line items for indirect costs and margins on actual costs only when such items are listed individually in Applications for Payment. Each item in the Schedule of Values and Applications for Payment shall be complete. Include the total cost and proportionate share of general overhead and profit margin for each item.

(1) Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at the Contractor's option.

- i. Schedule Updating: Update and resubmit the Schedule of Values prior to the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

D. APPLICATIONS FOR PAYMENT

- 1. Each Application for Payment shall be consistent with previous applications and payments as certified by the Architect and paid for by the Owner.
 - a. The initial Application for Payment, the Application for Payment at time of Substantial Completion, and the final Application for Payment involve additional requirements.
- 2. Payment-Application Times: Unless otherwise indicated, the date for each progress payment is the 15th day of each month. The period covered by each Application for Payment starts on the day following the end of the preceding period and ends 15 days prior to the date for each progress payment.
- 3. Payment-Application Forms: Use AIA Document G702 and Continuation Sheets G703 as the form for Applications for Payment.
- 4. Application Preparation: Complete every entry on the form. Include notarization and execution by a person authorized to sign legal documents on behalf of the Contractor. The Architect will return incomplete applications without action.
 - a. Entries shall match data on the Schedule of Values and the Contractor's Construction Schedule. Use updated schedules if revisions were made.
 - b. Include amounts of Change Orders and Construction Change Directives issued prior to the last day of the construction period covered by the application.

5. Transmittal: Submit 1 signed and notarized original copy of each Application for Payment to the Architect by a method ensuring receipt within 24 hours. One copy shall be complete, including waivers of lien and similar attachments, when required.
 - a. Transmit each copy with a transmittal form listing attachments and recording appropriate information related to the application, in a manner acceptable to the Architect.
6. Initial Application for Payment: Administrative actions and submittals, that must precede or coincide with submittal of the first Application for Payment, include the following:
 - a. List of subcontractors.
 - b. List of principal suppliers and fabricators.
 - c. Schedule of Values.
 - d. Contractor's Construction Schedule (preliminary if not final).
 - e. Schedule of principal products.
 - f. Schedule of unit prices.
 - g. Submittal Schedule (preliminary if not final).
 - h. List of Contractor's staff assignments.
 - i. List of Contractor's principal consultants.
 - j. Copies of building permits.
 - k. Copies of authorizations and licenses from governing authorities for performance of the Work.
 - l. Initial progress report.
 - m. Report of preconstruction meeting.
 - n. Certificates of insurance and insurance policies.
 - o. Performance and payment bonds if not already submitted.
 - p. Data needed to acquire the Owner's insurance.
7. Application for Payment at Substantial Completion: Following issuance of the Certificate of Substantial Completion, submit an Application for Payment.
 - a. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
 - b. Administrative actions and submittals that shall precede or coincide with this application include:
 - (1) Occupancy permits and similar approvals.
 - (2) Warranties (guarantees) and maintenance agreements.
 - (3) Test/adjust/balance records.
 - (4) Maintenance instructions.
 - (5) Meter readings.
 - (6) Startup performance reports.
 - (7) Changeover information related to Owner's occupancy, use, operation, and maintenance.
 - (8) Final cleaning.
 - (9) Application for reduction of retainage and consent of surety.
 - (10) Advice on shifting insurance coverages.
 - (11) Final progress photographs.
 - (12) List of incomplete Work, recognized as exceptions to Architect's Certificate of Substantial Completion.
8. Final Payment Application: Administrative actions and submittals that must precede or coincide with submittal of the final Application for Payment include the following:
 - a. Completion of Project closeout requirements.
 - b. Completion of items specified for completion after Substantial Completion.
 - c. Ensure that unsettled claims will be settled.
 - d. Ensure that incomplete Work is not accepted and will be completed without undue delay.
 - e. Transmittal of required Project construction records to the Owner.
 - f. Certified property survey.

- g. Proof that taxes, fees, and similar obligations were paid.
- h. Removal of temporary facilities and services.
- i. Removal of surplus materials, rubbish, and similar elements.

PART II. - PRODUCTS (Not Applicable)

PART III. - EXECUTION (Not Applicable)

END OF SECTION 010270

DIVISION 1 - GENERAL REQUIREMENTS
SECTION 010350 - MODIFICATION PROCEDURES

PART I. - GENERAL

A. RELATED DOCUMENTS

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

B. SUMMARY

1. This Section specifies administrative and procedural requirements for handling and processing contract modifications.

C. MINOR CHANGES IN THE WORK

1. The Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or Contract Time, on AIA Form G710 or other appropriate form, Architect's Supplemental Instructions.

D. CHANGE ORDER PROPOSAL REQUESTS

1. Owner-Initiated Proposal Requests: The Architect will issue a detailed description of proposed changes in the Work that will require adjustment to the Contract Sum or Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - a. Proposal requests issued by the Architect are for information only. Do not consider them as an instruction either to stop work in progress or to execute the proposed change.
 - b. Within 20 days of receipt of a proposal request, submit an estimate of cost necessary to execute the change to the Architect for the Owner's review.
 - (1) Include a list of quantities of products required and unit costs, with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.
 - (2) Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - (3) Include a statement indicating the effect the proposed change in the Work will have on the Contract Time.
2. Contractor-Initiated Proposals: When latent or unforeseen conditions require modifications to the Contract, the Contractor may propose changes by submitting a request for a change to the Architect.
 - a. Include a statement outlining the reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and Contract Time.
 - b. Include a list of quantities of products required and unit costs, with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.
 - c. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - d. Comply with requirements in Section "Product Substitutions" if the proposed change requires substitution of one product or system for a product or system specified.
3. Proposal Request Form: Use AIA Document G709 for Change Order Proposal Requests.

E. ALLOWANCES

1. Allowance Adjustment: For allowance-cost adjustment, base each Change Order Proposal on the difference between the actual purchase amount and the allowance, multiplied by the final measurement of work-in-place. Where applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.
 - a. Include installation costs in the purchase amount only were indicated as part of the allowance.
 - b. When requested, prepare explanations and documentation to substantiate the margins claimed.
 - c. Submit substantiation of a change in scope of work claimed in the Change Orders related to unit-cost allowances.
 - d. The Owner reserves the right to establish the actual quantity of work-in-place by independent quantity survey, measure, or count.
2. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or the Contractor's handling, labor, installation, overhead, and profit. Submit claims within 21 days of receipt of the Change Order or Construction Change Directive authorizing work to proceed. The Owner will reject claims submitted later than 21 days.
 - a. Do not include the Contractor's or subcontractors indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of work has changed from what could have been foreseen from information in Contract Documents.
 - b. No change to the Contractor's indirect expense is permitted for selection of higher or lower-priced materials or systems of the same scope and nature as originally indicated.

F. CONSTRUCTION CHANGE DIRECTIVE

1. Construction Change Directive: When the Owner and the Contractor disagree on the terms of a Proposal Request, the Architect may issue a Construction Change Directive on AIA Form G714. The Construction Change Directive instructs the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
 - a. The Construction Change Directive contains a complete description of the change in the Work. It also designates the method to be followed to determine change in the Contract Sum or Contract Time.
2. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
 - a. After completion of the change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

G. CHANGE ORDER PROCEDURES

1. Upon the Owner's approval of a Proposal Request, the Architect will issue a Change Order for signatures of the Owner and the Contractor on AIA Form G701.

PART II. - PRODUCTS (Not Applicable)

PART III. - EXECUTION (Not Applicable)

END OF SECTION 010350

DIVISION 1 - GENERAL REQUIREMENTS
SECTION 010400 - COORDINATION

PART I. - GENERAL

A. RELATED DOCUMENTS

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

B. SUMMARY

1. This Section includes administrative and supervisory requirements necessary for coordinating construction operations including, but not necessarily limited to, the following:
 - a. General project coordination procedures.
 - b. Conservation.
 - c. Coordination Drawings.
 - d. Administrative and supervisory personnel.
 - e. Cleaning and protection.

C. COORDINATION

1. Coordinate construction operations included in various Sections of these Specifications to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections that depend on each other for proper installation, connection, and operation.
 - a. Schedule construction operations in the sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - b. Coordinate installation of different components to assure maximum accessibility for required maintenance, service, and repair.
 - c. Make provisions to accommodate items scheduled for later installation.
2. Where necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.
 - a. Prepare similar memoranda for the Owner and separate contractors where coordination of their work is required.
3. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and assure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 - a. Preparation of schedules.
 - b. Installation and removal of temporary facilities.
 - c. Delivery and processing of submittals.
 - d. Progress meetings.
 - e. Project closeout activities.

D. SUBMITTALS

1. Coordination Drawings: Prepare coordination drawings where careful coordination is needed for installation of products and materials fabricated by separate entities. Prepare coordination drawings where limited space availability necessitates maximum utilization of space for efficient installation of different components.
 - a. Show the relationship of components shown on separate Shop Drawings.
 - b. Indicate required installation sequences.
 - c. Comply with requirements contained in Section "Submittals."
2. Staff Names: Within 15 days of commencement of construction operations, submit a list of the Contractor's principal staff assignments, including the superintendent and other personnel in attendance at the Project Site. Identify individuals and their duties and responsibilities. List their addresses and telephone numbers.
 - a. Post copies of the list in the Project meeting room, the temporary field office, and each temporary telephone.

PART II. - PRODUCTS (Not Applicable)

PART III. - EXECUTION

A. GENERAL COORDINATION PROVISIONS

1. Inspection of Conditions: Require the Installer of each major component to inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.
2. Coordinate temporary enclosures with required inspections and tests to minimize the necessity of uncovering completed construction for that purpose.

B. CLEANING AND PROTECTION

1. Clean and protect construction in progress and adjoining materials in place, during handling and installation. Apply protective covering where required to assure protection from damage or deterioration at Substantial Completion.
2. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to assure operability without damaging effects.
3. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period. Where applicable, such exposures include, but are not limited to, the following:
 - a. Excessive static or dynamic loading.
 - b. Excessive internal or external pressures.
 - c. Excessively high or low temperatures.
 - d. Thermal shock.

- e. Excessively high or low humidity.
- f. Air contamination or pollution.
- g. Water or ice.
- h. Solvents.
- i. Chemicals.
- j. Light.
- k. Radiation.
- l. Puncture.
- m. Abrasion.
- n. Heavy traffic.
- o. Soiling, staining, and corrosion.
- p. Bacteria.
- q. Rodent and insect infestation.
- r. Combustion.
- s. Electrical current.
- t. High-speed operation.
- u. Improper lubrication.
- v. Unusual wear or other misuse.
- w. Contact between incompatible materials.
- x. Destructive testing.
- y. Misalignment.
- z. Excessive weathering.
- aa. Unprotected storage.
- bb. Improper shipping or handling.
- cc. Theft.
- dd. Vandalism.

END OF SECTION 010400

DIVISION 1 - GENERAL REQUIREMENTS
SECTION 012000 - PROJECT MEETINGS

PART I. - GENERAL

A. RELATED DOCUMENTS

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

B. SUMMARY

1. This Section specifies administrative and procedural requirements for project meetings, including, but not limited to, the following:
 - a. Preconstruction conferences.
 - b. Preinstallation conferences.
 - c. Progress meetings.

C. PRECONSTRUCTION CONFERENCE

1. Schedule a preconstruction conference before starting construction, at a time convenient to the Owner and the Architect, but no later than 15 days after execution of the Agreement. Hold the conference at the Project Site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.
2. Attendees: Authorized representatives of the Owner, Architect, and their consultants; the Contractor and its superintendent; major subcontractors; manufacturers; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.
3. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Tentative construction schedule.
 - b. Critical work sequencing.
 - c. Designation of responsible personnel.
 - d. Procedures for processing field decisions and Change Orders.
 - e. Procedures for processing Applications for Payment.
 - f. Distribution of Contract Documents.
 - g. Submittal of Shop Drawings, Product Data, and Samples.
 - h. Preparation of record documents.
 - i. Use of the premises.
 - j. Parking availability.
 - k. Office, work, and storage areas.
 - l. Equipment deliveries and priorities.
 - m. Safety procedures.
 - n. First aid.
 - o. Security.
 - p. Housekeeping.
 - q. Working hours.

D. PREINSTALLATION CONFERENCES

1. Conduct a preinstallation conference at the Project Site before each construction activity that requires coordination with other construction.

2. Attendees: The Installer and representatives of manufacturers and fabricators involved in or affected by the installation, and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise the Architect of scheduled meeting dates.
 - a. Review the progress of other construction activities and preparations for the particular activity under consideration at each preinstallation conference, including requirements for the following:
 - (1) Contract Documents.
 - (2) Options.
 - (3) Related Change Orders.
 - (4) Purchases.
 - (5) Deliveries.
 - (6) Shop Drawings, Product Data, and quality-control samples.
 - (7) Review of mockups.
 - (8) Possible conflicts.
 - (9) Compatibility problems.
 - (10) Time schedules.
 - (11) Weather limitations.
 - (12) Manufacturer's recommendations.
 - (13) Warranty requirements.
 - (14) Compatibility of materials.
 - (15) Acceptability of substrates.
 - (16) Temporary facilities.
 - (17) Space and access limitations.
 - (18) Governing regulations.
 - (19) Safety.
 - (20) Inspecting and testing requirements.
 - (21) Required performance results.
 - (22) Recording requirements.
 - (23) Protection.
 - b. Record significant discussions and agreements and disagreements of each conference, and the approved schedule. Promptly distribute the record of the meeting to everyone concerned, including the Owner and the Architect.
 - c. Do not proceed with the installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of Work and reconvene the conference at the earliest feasible date.

E. PROGRESS MEETINGS

1. Conduct progress meetings at the Project Site at regular intervals. Notify the Owner and the Architect of scheduled meeting dates. Coordinate dates of meetings with preparation of the payment request.
2. Attendees: In addition to representatives of the Owner and the Architect, each subcontractor, supplier, or other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.
3. Agenda: Review and correct or approve minutes of the previous progress meeting. Review

other items of significance that could affect progress. Include topics for discussion as appropriate to the status of the Project.

- a. Contractor's Construction Schedule: Review progress since the last meeting. Determine where each activity is in relation to the Contractor's Construction Schedule, whether on time or ahead or behind schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - b. Review the present and future needs of each entity present, including the following:
 - (1) Interface requirements.
 - (2) Time.
 - (3) Sequences.
 - (4) Status of submittals.
 - (5) Deliveries.
 - (6) Off-site fabrication problems.
 - (7) Access.
 - (8) Site utilization.
 - (9) Temporary facilities and services.
 - (10) Hours of work.
 - (11) Hazards and risks.
 - (12) Housekeeping.
 - (13) Quality and work standards.
 - (14) Change Orders.
 - (15) Documentation of information for payment requests.
4. Reporting: No later than 3 days after each meeting, distribute minutes of the meeting to each party present and to parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.
- a. Schedule Updating: Revise the Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue the revised schedule concurrently with the report of each meeting.

PART II. - PRODUCTS (Not Applicable)

PART III. - EXECUTION (Not Applicable)

END OF SECTION 012000

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 012100 - ALLOWANCES

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Cash allowances.
- B. Payment and modification procedures relating to allowances.

1.02 CASH ALLOWANCES

- A. Costs Included in Cash Allowances: Cost of Product to Contractor or Subcontractor, less applicable trade discounts, delivery to site, applicable taxes.
- B. Costs Not Included in Cash Allowances: Product handling at the site, including unloading, uncrating, and storage; protection of Products from elements and from damage; and labor for installation and finishing. These costs are included in the contract amount.
- C. Contractor Responsibilities:
 - 1. Assist Architect/Engineer in selection of Products, suppliers, and installers.
 - 2. Obtain proposals from suppliers and installers and offer recommendations.
 - 3. On notification of selection by Architect/Engineer execute purchase agreement with designated supplier and installer.
 - 4. Arrange for and process shop drawings, product data, and samples. Arrange for delivery.
 - 5. Promptly inspect Products upon delivery for completeness, damage, and defects. Submit claims for transportation damage.
- D. Differences in costs will be adjusted by Change Order.

1.03 ALLOWANCES SCHEDULE

- A. Face Brick Allowance: Include the cost of Eight Hundred Fifty Dollars (\$850.00) per one thousand bricks for purchase of face brick masonry units as defined and specified in Specifications Division 4 Section "Unit Masonry".

PART 2 PRODUCTS - NOT USED

PART3 EXECUTION - NOT USED

END OF SECTION

DIVISION 1 - GENERAL REQUIREMENTS
SECTION 012300 ALTERNATES

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for Additive and Deductive Alternates.

1.3 DEFINITIONS

- A. Alternate: An amount proposed by Bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added or deducted from the Base Bid amount if the Owner decides to accept a corresponding change whether in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - 1. The Cost or Credit for each Alternate is the net addition to or deduction from the Contract Sum to incorporate the alternate into the Work. No other adjustments are made to the Contract Sum.
 - 2. The Bidder shall be responsible for determining from the Contract Documents the effects of each Alternate on the Contract Time and the Contract Sum.
 - 3. Acceptance or non-acceptance of any Alternates by the Owner shall have no effect on the Contract Time.

1.4 PROCEDURES

- A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the Alternate into the Project
 - 1. Include as part of each Alternate, miscellaneous devices, accessory objects, and similar items incidental to or require for a complete installation whether or not indicated as part of the Alternate.
- B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each Alternate. Indicate if Alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to Alternates.
- C. Execute accepted Alternates under the same conditions as other work of the Contract.
- D. Schedule: A Schedule of Alternates is included at the end of this Section. Refer to appropriate Specification Sections which contain requirements for materials necessary to achieve the work described under each Alternate:

1.5 SCHEDULE OF ADDITIVE AND DEDUCTIVE ALTERNATES

- A. Alternates are described as defined by the Bid Documents which are noted on the Bid Form:
- B. Alternates described below are comprised of groups of like or related items which are packaged into a broad category of work elements. A detailed description and list of work elements is provided for each Alternate Package.
- C. Add Alternates to Base Bid:

Additive Alternate No.1: Add covered front Porch 100 as detailed.

Additive Alternate No.2: Add two new automatic sliding vehicular gates and gate operators and associated fencing, concrete driveway apron, crushed stone driveway and electrical work.

Additive Alternate No. 3: Replace Intercom System as indicated on Electrical Drawings.

END OF DOCUMENT

DIVISION 1 - GENERAL REQUIREMENTS
SECTION 013000 - SUBMITTALS

PART I. - GENERAL

A. RELATED DOCUMENTS

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

B. SUMMARY

1. This Section includes administrative and procedural requirements for submittals required for performance of the Work, including the following:
 - a. Contractor's construction schedule.
 - b. Submittal schedule.
 - c. Daily construction reports.
 - d. Shop Drawings.
 - e. Product Data.
 - f. Samples.
 - g. Quality assurance submittals.
2. Administrative Submittals: Refer to other Division 1 Sections and other Contract Documents for requirements for administrative submittals. Such submittals include, but are not limited to, the following:
 - a. Permits.
 - b. Applications for Payment.
 - c. Performance and payment bonds.
 - d. Insurance certificates.
 - e. List of subcontractors.

C. DEFINITIONS

1. Coordination Drawings show the relationship and integration of different construction elements that require careful coordination during fabrication or installation to fit in the space provided or to function as intended.
 - a. Preparation of Coordination Drawings is specified in Division 1 Section "Coordination" and may include components previously shown in detail on Shop Drawings or Product Data.
2. Field samples are full-size physical examples erected on-site to illustrate finishes, coatings, or finish materials. Field samples are used to establish the standard by which the Work will be judged.
3. Mockups are full-size assemblies for review of construction, coordination, testing, or operation; they are not Samples.

D. SUBMITTAL PROCEDURES

1. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.
 - a. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.

- i. Coordinate transmittal of different types of submittals for related elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination.
 - (1) The Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received.
- b. Processing: To avoid the need to delay installation as a result of the time required to process submittals, allow sufficient time for submittal review, including time for resubmittals.
 - (1) Allow a reasonable amount of time for initial review.
 - (2) If an intermediate submittal is necessary, process the same as the initial submittal.
 - (3) Allow a reasonable amount of time for reprocessing each submittal.
 - (4) No extension of Contract Time will be authorized because of failure to transmit submittals to the Architect sufficiently in advance of the Work to permit processing.
2. Submittal Preparation: Place a permanent label or title block on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.
 - a. Provide a space approximately 4 by 5 inches (100 by 125 mm) on the label or beside the title block on Shop Drawings to record the Contractor's review and approval markings and the action taken.
 - b. Include the following information on the label for processing and recording action taken.
 - (1) Project name.
 - (2) Date.
 - (3) Name and address of the Architect.
 - (4) Name and address of the Contractor.
 - (5) Name and address of the subcontractor.
 - (6) Name and address of the supplier.
 - (7) Name of the manufacturer.
 - (8) Number and title of appropriate Specification Section.
 - (9) Drawing number and detail references, as appropriate.
3. Submittal Transmittal: Package each submittal appropriately for transmittal and handling. Transmit each submittal from the Contractor to the Architect using the transmittal form included with these contract documents. The Architect will not accept submittals received from sources other than the Contractor, or one not transmitted with the proper form properly filled out.
 - a. On the transmittal, record relevant information and requests for data. On the form, or separate sheet, record deviations from Contract Document requirements, including variations and limitations. Include Contractor's certification that information complies with Contract Document requirements.
 - b. Transmittal Form: Use the form included with these contract documents.

E. CONTRACTOR'S CONSTRUCTION SCHEDULE

1. Bar-Chart Schedule: Prepare a fully developed, horizontal bar-chart-type, contractor's construction schedule. Submit within 30 days after the date established for "Commencement of the Work."
 - a. Provide a separate time bar for each significant construction activity. Provide a continuous vertical line to identify the first working day of each week. Use the same breakdown of units of the Work as indicated in the "Schedule of Values."
 - b. Within each time bar, indicate estimated completion percentage in 10 percent increments. As Work progresses, place a contrasting mark in each bar to indicate Actual Completion.
 - c. Prepare the schedule on a sheet, or series of sheets, of stable transparency, or other reproducible media, of sufficient width to show data for the entire construction period.
 - d. Secure time commitments for performing critical elements of the Work from parties involved.

- Coordinate each element on the schedule with other construction activities; include minor elements involved in the sequence of the Work. Show each activity in proper sequence. Indicate graphically the sequences necessary for completion of related portions of the Work.
- e. Coordinate the Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittal Schedule, progress reports, payment requests, and other schedules.
 - f. Indicate completion in advance of the date established for Substantial Completion. Indicate Substantial Completion on the schedule to allow time for the Architect's procedures necessary for certification of Substantial Completion.
2. Phasing: On the schedule, show how requirements for phased completion to permit Work by separate Contractors and partial occupancy by the Owner affect the sequence of Work.
 3. Cost Correlation: At the head of the schedule, provide a cost correlation line, indicating planned and actual costs. On the line, show dollar volume of Work performed as of the dates used for preparation of payment requests.
 - a. Refer to Division 1 Section "Applications for Payment" for cost reporting and payment procedures.
 4. Distribution: Following response to the initial submittal, print and distribute copies to the Architect, Owner, subcontractors, and other parties required to comply with scheduled dates. Post copies in the Project meeting room and temporary field office.
 - a. When revisions are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in construction activities.
 5. Schedule Updating: Revise the schedule after each meeting, event, or activity where revisions have been recognized or made. Issue the updated schedule concurrently with the report of each meeting.

F. SUBMITTAL SCHEDULE

1. After development and acceptance of the Contractor's Construction Schedule, prepare a complete schedule of submittals. Submit the schedule within 10 days of the date required for submittal of the Contractor's Construction Schedule.
 - a. Coordinate Submittal Schedule with the list of subcontracts, Schedule of Values, and the list of products as well as the Contractor's Construction Schedule.
 - b. Prepare the schedule in chronological order. Provide the following information:
 - (1) Scheduled date for the first submittal.
 - (2) Related Section number.
 - (3) Submittal category (Shop Drawings, Product Data, or Samples).
 - (4) Name of the subcontractor.
 - (5) Description of the part of the Work covered.
 - (6) Scheduled date for resubmittal.
 - (7) Scheduled date for the Architect's final release or approval.
2. Distribution: Following response to the initial submittal, print and distribute copies to the Architect, Owner, subcontractors, and other parties required to comply with submittal dates indicated. Post copies in the Project meeting room and field office.
 - a. When revisions are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in construction activities.
3. Schedule Updating: Revise the schedule after each meeting or activity where revisions have been recognized or made. Issue the updated schedule concurrently with the report of each meeting.

G. DAILY CONSTRUCTION REPORTS

1. Prepare a daily construction report recording the following information concerning events at the site, and submit duplicate copies to the Architect at weekly intervals:
 - a. List of subcontractors at the site.
 - b. Approximate count of personnel at the site.
 - c. High and low temperatures, general weather conditions.
 - d. Accidents and unusual events.
 - e. Meetings and significant decisions.
 - f. Stoppages, delays, shortages, and losses.
 - g. Meter readings and similar recordings.
 - h. Emergency procedures.
 - i. Orders and requests of governing authorities.
 - j. Change Orders received, implemented.
 - k. Services connected, disconnected.
 - l. Equipment or system tests and startups.
 - m. Partial Completions, occupancies.
 - n. Substantial Completions authorized.

H. SHOP DRAWINGS

1. Submit newly prepared information drawn accurately to scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not a Shop Drawing.
2. Shop Drawings include fabrication and installation Drawings, setting diagrams, schedules, patterns, templates and similar Drawings. Include the following information:
 - a. Dimensions.
 - b. Identification of products and materials included by sheet and detail number.
 - c. Compliance with specified standards.
 - d. Notation of coordination requirements.
 - e. Notation of dimensions established by field measurement.
 - f. Sheet Size: Except for templates, patterns and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm) but no larger than 36 by 48 inches (890 by 1220 mm).
 - g. Initial Submittal: Submit one correctable, translucent, reproducible print and one blue- or black-line print for the Architect's review. The Architect will return the reproducible print.
 - h. Final Submittal: Submit 3 blue- or black-line prints; submit 5 prints where required for maintenance manuals. The Architect will retain 2 prints and return the remainder.
 - (1) One of the prints returned shall be marked up and maintained as a "Record Document."
 - (2) If the final submittal is not responsive to the comments on the initial submittal, the submittal will be re-reviewed and the contractor will be charged the Architect's customary rate for the re-review.

- i. Do not use Shop Drawings without an appropriate final stamp indicating action taken.

I. PRODUCT DATA

1. Collect Product Data into a single submittal for each element of construction or system. Product Data includes printed information, such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams, and performance curves.

- a. Mark each copy to show applicable choices and options. Where printed Product Data includes information on several products that are not required, mark copies to indicate the applicable information. Include the following information:
 - (1) Manufacturer's printed recommendations.
 - (2) Compliance with trade association standards.
 - (3) Compliance with recognized testing agency standards.
 - (4) Application of testing agency labels and seals.
 - (5) Notation of dimensions verified by field measurement.
 - (6) Notation of coordination requirements.
- b. Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed.
- c. Submittals: Submit 3 copies of each required submittal; submit 4 copies where required for maintenance manuals. The Architect will retain one and will return the other marked with action taken and corrections or modifications required.
 - (1) Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal.
- d. Distribution: Furnish copies of final submittal to installers, subcontractors, suppliers, manufacturers, fabricators, and others required for performance of construction activities. Show distribution on transmittal forms.
 - (1) Do not proceed with installation until a copy of Product Data is in the Installer's possession.
 - (2) Do not permit use of unmarked copies of Product Data in connection with construction.

J. SAMPLES

1. Submit full-size, fully fabricated Samples cured and finished as specified and physically identical with the material or product proposed. Samples include partial sections of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches showing color, texture, and pattern.
 - a. Mount or display Samples in the manner to facilitate review of qualities indicated. Prepare Samples to match the Architect's sample. Include the following:
 - (1) Specification Section number and reference.
 - (2) Generic description of the Sample.
 - (3) Sample source.
 - (4) Product name or name of the manufacturer.
 - (5) Compliance with recognized standards.
 - (6) Availability and delivery time.
 - b. Submit Samples for review of size, kind, color, pattern, and texture. Submit Samples for a final check of these characteristics with other elements and a comparison of these characteristics between the final submittal and the actual component as delivered and installed.
 - (1) Where variation in color, pattern, texture, or other characteristic is inherent in the material or product represented, submit at least 3 multiple units that show approximate limits of the variations.
 - (2) Samples not incorporated into the Work, or otherwise designated as the Owner's property, are the property of the Contractor and shall be removed from the site prior to Substantial Completion.
 - c. Preliminary Submittals: Submit a full set of choices where Samples are submitted for

selection of color, pattern, texture, or similar characteristics from a range of standard choices.

- (1) The Architect will review and return preliminary submittals with the Architect's notation, indicating selection and other action.

K. QUALITY ASSURANCE SUBMITTALS

1. Submit quality-control submittals, including design data, certifications, manufacturer's instructions, manufacturer's field reports, and other quality-control submittals as required under other Sections of the Specifications.
2. Certifications: Where other Sections of the Specifications require certification that a product, material, or installation complies with specified requirements, submit a notarized certification from the manufacturer certifying compliance with specified requirements.
 - a. Signature: Certification shall be signed by an officer of the manufacturer or other individual authorized to sign documents on behalf of the company.
3. Inspection and Test Reports: Requirements for submittal of inspection and test reports from independent testing agencies are specified in Division 1 Section "Quality Control."

L. ARCHITECT'S ACTION

1. Except for submittals for the record or information, where action and return is required, the Architect will review each submittal, mark to indicate action taken, and return promptly.
 - a. Compliance with specified characteristics is the Contractor's responsibility.
2. Action Stamp: The Architect will stamp each submittal with a uniform, action stamp. The Architect will mark the stamp appropriately to indicate the action taken, as follows:
 - a. Final Unrestricted Release: When the Architect marks a submittal "No Exception Taken", the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents. Final payment depends on that compliance.
 - b. Final-But-Restricted Release: When the Architect marks a submittal "Make Corrections Noted", the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents. Final payment depends on that compliance.
 - c. Returned for Resubmittal: When the Architect marks a submittal "Revise and Resubmit," do not proceed with Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal according to the notations; resubmit without delay. Repeat if necessary to obtain different action mark.
 - (1) Do not use, or allow others to use, submittals marked "Revise and Resubmit" at the Project Site or elsewhere where Work is in progress.
 - d. Other Action: Where a submittal is for information or record purposes or special processing or other activity, the Architect will return the submittal marked "Action Not Required."
3. Unsolicited Submittals: The Architect will return unsolicited submittals to the sender without action.

PART M. - PRODUCTS (Not Applicable)

PART N. - EXECUTION (Not Applicable)

END OF SECTION 013000

DIVISION 1 - GENERAL REQUIREMENTS
SECTION 013100 - SCHEDULES AND REPORTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. General: This Section specifies administrative and procedural requirements for schedules and reports required for proper performance of the Work.
- B. Coordination: Each prime Contractor shall closely coordinate scheduling and reporting with the scheduling and reporting of other prime Contractors.
- C. Schedules required include:
 - 1. Preliminary Construction Schedule.
 - 2. Contractor's Construction Schedule.
- D. Reports required include:
 - 1. Special reports.

1.3 PRELIMINARY CONSTRUCTION SCHEDULE

- A. Bar-Chart Schedule: Submit a preliminary horizontal bar-chart type construction schedule within 7 days of the date established for Commencement of the Work.
 - 1. Provide a separate time bar for each significant construction activity. Coordinate each element on the schedule with other construction activities. Schedule each construction activity in proper sequence. Provide a continuous vertical line to identify the first working day of each week.
 - 2. Indicate completion of the Work in advance of the date established for Substantial Completion.

1.4 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Bar-Chart Schedule: Prepare a comprehensive, fully developed, horizontal bar-chart type Contractor's Construction Schedule based on the Preliminary Construction Schedule and on whatever updating and feedback was received since the start of the Project.
 - 1. Submit the schedule within 60 days of the date established for commencement of the Work.
 - 2. Provide a separate time bar for each significant construction activity. Provide a continuous vertical line to identify the first working day of each week.
 - a. If practical, use the same breakdown of units of the Work as indicated in the "Schedule of Values".
 - 3. For significant construction activities that require 3 months or longer to complete, indicate an estimated completion percentage in 10 percent increments within the time bar. As Work progresses, place a contrasting mark in each bar to indicate actual completion percentage.
 - 4. Prepare the Schedule on a sheet, or series of sheets, of stable transparency, or other reproducible media, of sufficient width to show data clearly for the entire construction period.
 - 5. Secure time commitments for performing critical elements of the Work from parties involved. Coordinate each element on the schedule with other portions of the Work; include minor elements involved in the overall sequence of the Work. Show each construction activity in proper sequence. Indicate graphically sequences necessary for completion of related portions of the Work.
 - 6. Coordinate the Contractor's Construction Schedule with the schedule of values, list of subcontracts, Submittal Schedule, progress reports, payment requests and other required schedules and reports.
 - 7. Indicate completion of the Work in advance of the date established for Substantial Completion. Indicate Substantial Completion on the Schedule to allow ample time for the Architect's

administrative procedures necessary for Certification of Substantial Completion.

- B. Phasing: Provide notations on the Schedule to show how the sequence of the Work is affected by the following:
1. Requirements for phased completion.
 2. Work by separate Contractors.
 3. Work by the Owner.
 4. Pre-purchased materials.
 5. Coordination with existing construction.
 6. Limitations of continued occupancies.
 7. Uninterruptable services.
 8. Partial occupancy prior to Substantial Completion.
 9. Site restrictions.
 10. Provisions for future construction.
 11. Seasonal variations.
 12. Environmental control
- C. Work Stages: Use crosshatched bars to indicate important stages of construction for each major portion of the Work.
- D. Such stages include, but are not necessarily limited to:
1. Subcontract awards.
 2. Purchases.
 3. Mockups.
 4. Fabrication.
 5. Sample testing.
 6. Deliveries.
 7. Installation.
 8. Testing.
 9. Adjusting.
 10. Curing.
 11. Start-up and placement into final use and operation.
- E. Area Separations: Provide a separate time bar to identify each major area of construction for each major portion of the Work. For the purposes of this article, a "major area" is defined as a story of construction, separate buildings or a similar significant construction element.
1. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
 - a. Structural Completion.
 - b. Permanent space enclosure.
 - c. Completion of mechanical installation.
 - d. Completion of the electrical portion of the Work.
 - e. Substantial Completion
- F. Distribution: Following the Architect's response to initial submittal of the Contractor's Construction Schedule, print and distribute copies to the Architect, Owner, separate contractors, subcontractors, suppliers, fabricators, and other parties required to comply with scheduled dates.
1. Post copies of the Schedule in the Project meeting room and temporary field office.
 2. When revisions are made, distribute the updated Schedule to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.
- G. Schedule Updating: Revise the Schedule immediately after each meeting or other activity, where revisions have been recognized or made. Issue the updated Schedule concurrently with report of each meeting.

1.5 SPECIAL REPORTS

- A. General: Submit special reports directly to the Owner within one day of an occurrence. Submit a copy to the Architect and other parties affected by the occurrence.
- B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at the site, prepare and submit a special report. List the chain of events, persons participating, and response by the Contractor's personnel, an evaluation of the results or effects and similar pertinent information. Advise the Owner in advance when such events are known or predictable.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 013100

DIVISION 1 - GENERAL REQUIREMENTS
SECTION 014000 - QUALITY CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for quality-control services.
- B. Quality-control services include inspections, tests, and related actions, including reports performed by Owner's Testing Laboratory, by independent agencies, and by governing authorities. They do not include contract enforcement activities performed by Architect.
- C. Inspection and testing services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with Contract Document requirements.
- D. Requirements of this Section relate to customized fabrication and installation procedures, not production of standard products.
 - 1. Specific quality-control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 - 2. Specified inspections, tests, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with Contract Document requirements.

1.3 RESPONSIBILITIES

- A. Contractor Responsibilities: Unless otherwise indicated as the responsibility of another identified entity, Contractor shall make arrangements for tests, inspections and approvals with the Testing Laboratory provided by the Owner. The Owner shall bear all related cost of tests, inspections, approvals, and field and laboratory testing of materials during construction.
 - 1. The Owner will provide a list of Testing Companies provided by the Owner.
 - 2. The Owner shall engage and pay for the services of a separate testing lab for proportioning and designing concrete mixes and classifying proposed borrow soils prior to start of construction to verify that proposed materials comply with specified requirements.
- B. Retesting: The Contractor shall make arrangements for retesting where results of inspections, tests, or other quality-control services prove unsatisfactory and indicate noncompliance with Contract Document requirements, regardless of whether the original test was Contractor's responsibility.
 - 1. The Owner shall bear all related cost of retesting construction, revised or replaced by the Contractor, where required tests performed on original construction indicated noncompliance with Contract Document requirements.
- C. Associated Services: The Contractor shall cooperate with agencies performing required inspections, tests, and similar services, and provide reasonable auxiliary services as requested. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include, but are not limited to, the following:
 - 1. Provide access to the Work.
 - 2. Furnish incidental labor and facilities necessary to facilitate inspections and tests.
 - 3. Take adequate quantities of representative samples of materials that require testing or assist

- the agency in taking samples.
 - 4. Provide facilities for storage and curing of test samples.
 - 5. Deliver samples to testing laboratories.
 - 6. Provide the agency with a preliminary design mix proposed for use for materials mixes that require control by the testing agency.
 - 7. Provide security and protection of samples and test equipment at the Project Site.
- D. Duties of the Testing Agency: The independent agency engaged to perform inspections, sampling, and testing of materials and construction specified in individual Sections shall cooperate with the Architect and the Contractor in performance of the agency's duties. The testing agency shall provide qualified personnel to perform required inspections and tests.
- 1. The agency shall notify the Architect and the Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 - 2. The agency is not authorized to release, revoke, alter, or enlarge requirements of the Contract Documents or approve or accept any portion of the Work.
 - 3. The agency shall not perform any duties of the Contractor.
- E. Coordination: Coordinate the sequence of activities to accommodate required services with a minimum of delay. Coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.
- 1. The Contractor is responsible for scheduling times for inspections, tests, taking samples, and similar activities.

1.4 SUBMITTALS

- A. Unless the Contractor is responsible for this service, the independent testing agency shall submit a certified written report, in duplicate, of each inspection, test, or similar service to the Architect. If the Contractor is responsible for the service, submit a certified written report, in duplicate, of each inspection, test, or similar service through the Contractor.
- 1. Submit additional copies of each written report directly to the governing authority, when the authority so directs.
 - 2. Report Data: Written reports of each inspection, test, or similar service include, but are not limited to, the following:
 - a. Date of issue.
 - b. Project title and number.
 - c. Name, address, and telephone number of testing agency.
 - d. Dates and locations of samples and tests or inspections.
 - e. Names of individuals making the inspection or test.
 - f. Designation of the Work and test method.
 - g. Identification of product and Specification Section.
 - h. Complete inspection or test data.
 - i. Test results and an interpretation of test results.
 - j. Ambient conditions at the time of sample taking and testing.
 - k. Comments or professional opinion on whether inspected or tested Work complies with Contract Document requirements.
 - l. Name and signature of laboratory inspector.
 - m. Recommendations on retesting.

1.5 QUALITY ASSURANCE

- A. Qualifications for Service Agencies: Inspection and testing service agencies, including independent testing laboratories, shall be prequalified as complying with the American Council of Independent Laboratories' "Recommended Requirements for Independent Laboratory Qualification" and that specialize in the types of inspections and tests to be performed.

1. Each independent inspection and testing agency engaged on the Project shall be authorized by authorities having jurisdiction to operate in the state where the Project is located.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

- A. General: Upon completion of inspection, testing, sample taking and similar services, repair damaged construction and restore substrates and finishes. Comply with Contract Document requirements for Division 1 Section "Cutting and Patching."
- B. Protect construction exposed by or for quality-control service activities and protect repaired construction.
- C. Repair and protection is Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing, or similar services.

END OF SECTION 014000

DIVISION 1 - GENERAL REQUIREMENTS
SECTION 01 42 00 - REFERENCE STANDARDS AND DEFINITIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 DEFINITIONS

- A. General: Basic contract definitions are included in the Conditions of the Contract.
- B. "Indicated": The term "indicated" refers to graphic representations, notes, or schedules on the Drawings; or to other paragraphs or schedules in the Specifications and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the user locate the reference. Location is not limited.
- C. "Directed": Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean directed by the Architect, requested by the Architect, and similar phrases.
- D. "Approved": The term "approved," when used in conjunction with the Architect's action on the Contractor's submittals, applications, and requests, is limited to the Architect's duties and responsibilities as stated in the Conditions of the Contract.
- E. "Regulations": The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": The term "furnish" means to supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": The term "install" describes operations at the Project site including the actual unloading, temporary storage, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": The term "provide" means to furnish and install, complete and ready for the intended use.
- I. "Installer": An installer is the Contractor or another entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier, who performs a particular construction activity including installation, erection, application, or similar operations. Installers are required to be experienced in the operations they are engaged to perform.
 - 1. The term "experienced," when used with the term "installer," means having successfully completed a minimum of 5 previous projects similar in size and scope to this Project; being familiar with the special requirements indicated; and having complied with requirements of authorities having jurisdiction.
 - 2. Trades: Using terms such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to trades people of the corresponding generic name.
 - 3. Assigning Specialists: Certain Sections of the Specifications require that specific construction activities shall be performed by specialists who are recognized experts in those operations. The specialists must be engaged for those activities, and their assignments are requirements over which the Contractor has no option. However, the ultimate responsibility for fulfilling contract requirements remains with the Contractor.
 - a. This requirement shall not be interpreted to conflict with enforcing building codes and similar regulations governing the Work. It is also not intended to interfere with local trade-union jurisdictional settlements and similar conventions.
- J. "Project site" is the space available to the Contractor for performing construction activities, either exclusively or in conjunction with others performing work as part of the Project. The extent of the

Project site is shown on the Drawings and may or may not be identical with the description of the land on which the Project is to be built.

- K. "Testing Agencies": A testing agency is an independent entity engaged to perform specific inspections or tests, either at the Project site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

1.3 SPECIFICATION FORMAT AND CONTENT EXPLANATION

- A. Specification Format: These Specifications are organized into Divisions and Sections based on the Construction Specifications Institute's 16-division format and "Master Format" numbering system.
- B. Specification Content: These Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be interpolated as the sense requires. Singular words shall be interpreted as plural and plural words interpreted as singular where applicable as the context of the Contract Documents indicates.
 2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the Text, subjective language is used for clarity to describe responsibilities that must be fulfilled indirectly by the Contractor or by others when so noted.
 - a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

1.4 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with the standards in effect as of the date of the Contract Documents.
- C. Conflicting Requirements: Where compliance with 2 or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different but apparently equal to the Architect for a decision before proceeding.
1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Refer uncertainties to the Architect for a decision before proceeding.
- D. Copies of Standards: Each entity engaged in construction on the Project must be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
1. Where copies of standards are needed to perform a required construction activity, the Contractor shall obtain copies directly from the publication source and make them available on request.

- E. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. Where abbreviations and acronyms are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards-generating organization, authorities having jurisdiction, or other entity applicable to the context of the text provision. Refer to Gale Research Inc.'s "Encyclopedia of Associations," which is available in most libraries.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 42 00

DIVISION 1 - GENERAL REQUIREMENTS
SECTION 015000 - CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1. - GENERAL

a. RELATED DOCUMENTS

- i. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

b. SUMMARY

- i. This Section includes requirements for construction facilities and temporary controls, including temporary utilities, support facilities, and security and protection.
- ii. Temporary utilities include, but are not limited to, the following:
 - (1) Water service and distribution.
 - (2) Temporary electric power and light.
 - (3) Temporary heat.
 - (4) Ventilation.
 - (5) Telephone service.
 - (6) Sanitary facilities, including drinking water.
 - (7) Storm and sanitary sewer.
- iii. Support facilities include, but are not limited to, the following:
 - (1) Field offices and storage sheds.
 - (2) Temporary roads and paving.
 - (3) Dewatering facilities and drains.
 - (4) Temporary enclosures.
 - (5) Hoists and temporary elevator use.
 - (6) Temporary project identification signs and bulletin boards.
 - (7) Waste disposal services.
 - (8) Rodent and pest control.
 - (9) Construction aids and miscellaneous services and facilities.
- iv. Security and protection facilities include, but are not limited to, the following:
 - (1) Temporary fire protection.
 - (2) Barricades, warning signs, and lights.
 - (3) Enclosure fence for the site.
 - (4) Environmental protection.

c. QUALITY ASSURANCE

- i. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction including, but not limited to, the following:
 - (1) Building code requirements.
 - (2) Health and safety regulations.
 - (3) Utility company regulations.
 - (4) Police, fire department, and rescue squad rules.

- (5) Environmental protection regulations.
- ii. Standards: Comply with NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations," ANSI A10 Series standards for "Safety Requirements for Construction and Demolition," and NECA Electrical Design Library "Temporary Electrical Facilities."
- (1) Electrical Service: Comply with NEMA, NECA, and UL standards and regulations for temporary electric service. Install service in compliance with NFPA 70 "National Electric Code."
- iii. Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

d. PROJECT CONDITIONS

- i. Temporary Utilities: Prepare a schedule indicating dates for implementation and termination of each temporary utility. At the earliest feasible time, when acceptable to the Owner, change over from use of temporary service to use of permanent service.
- ii. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Relocate temporary services and facilities as the Work progresses. Do not overload facilities or permit them to interfere with progress. Take necessary fire-prevention measures. Do not allow hazardous, dangerous, or unsanitary conditions, or public nuisances to develop or persist on-site.

PART 2. - PRODUCTS

a. MATERIALS

- i. General: Provide new materials. If acceptable to the Architect, the Contractor may use undamaged, previously used materials in serviceable condition. Provide materials suitable for use intended.
- ii. Lumber and Plywood:
 - (1) For signs and directory boards, provide exterior-type, Grade B-B high-density concrete form overlay plywood of sizes and thicknesses indicated.
- iii. Tarpaulins: Provide waterproof, fire-resistant, UL-labeled tarpaulins with flame-spread rating of 15 or less. For temporary enclosures, provide translucent, nylon-reinforced, laminated polyethylene or polyvinyl chloride, fire-retardant tarpaulins.
- iv. Water: Provide potable water approved by local health authorities.
- v. Open-Mesh Fencing: Provide temporary plastic safety fencing 4 feet high with posts. UV stabilized. Bright orange color.

b. EQUIPMENT

- i. General: Provide new equipment. If acceptable to the Architect, the Contractor may use undamaged, previously used equipment in serviceable condition. Provide equipment suitable for use intended.
- ii. Water Hoses: Provide 3/4-inch (19-mm), heavy-duty, abrasion-resistant, flexible rubber hoses 100 feet (30 m) long, with pressure rating greater than the maximum pressure of the water distribution system. Provide adjustable shutoff nozzles at hose discharge.
- iii. Electrical Outlets: Provide properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120-Volt plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button, and pilot light for connection of power tools

and equipment.

- iv. Electrical Power Cords: Provide grounded extension cords. Use hard-service cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.
- v. Lamps and Light Fixtures: Provide general service incandescent lamps of wattage required for adequate illumination. Provide guard cages or tempered-glass enclosures where exposed to breakage. Provide exterior fixtures where exposed to moisture.
- vi. Heating Units: Provide temporary heating units that have been tested and labeled by UL, FM, or another recognized trade association related to the type of fuel being consumed.
- vii. Temporary Offices: Provide prefabricated or mobile units or similar job-built construction with lockable entrances, operable windows, and serviceable finishes. Provide heated and air-conditioned units on foundations adequate for normal loading.
- viii. Temporary Toilet Units: Provide self-contained, single-occupant toilet units of the chemical, aerated recirculation, or combustion type. Provide units properly vented and fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.
- ix. Fire Extinguishers: Provide hand-carried, portable, UL-rated, Class A fire extinguishers for temporary offices and similar spaces. In other locations, provide hand-carried, portable, UL-rated, Class ABC, dry-chemical extinguishers or a combination of extinguishers of NFPA-recommended classes for the exposures.

- (1) Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.

PART 3. - EXECUTION

a. INSTALLATION

- i. Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.
- ii. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

b. TEMPORARY UTILITY INSTALLATION

- i. General: Engage the appropriate local utility company to install temporary service or connect to existing service. Where company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with company recommendations.
 - (1) Arrange with company and existing users for a time when service can be interrupted, if necessary, to make connections for temporary services.
 - (2) Provide adequate capacity at each stage of construction. Prior to temporary utility availability, provide trucked-in services.
 - (3) Obtain easements to bring temporary utilities to the site where the Owner's easements cannot be used for that purpose.
 - (4) Use Charges: Cost or use charges for temporary facilities are not chargeable to the Owner or Architect. Neither the Owner nor Architect will accept cost or use charges as a basis of claims for Change Orders.
- ii. Water Service: Install water service and distribution piping of sizes and pressures adequate for construction until permanent water service is in use.

- (1) Sterilization: Sterilize temporary water piping prior to use.
- iii. Temporary Electric Power Service: Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include meters, transformers, overload-protected disconnects, automatic ground-fault interrupters, and main distribution switch gear.
 - (1) Install electric power service underground, except where overhead service must be used.
 - (2) Power Distribution System: Install wiring overhead and rise vertically where least exposed to damage. Where permitted, wiring circuits not exceeding 125 Volts, ac 20 Ampere rating, and lighting circuits may be nonmetallic sheathed cable where overhead and exposed for surveillance.
- iv. Temporary Lighting: When overhead floor or roof deck has been installed, provide temporary lighting with local switching.
 - (1) Install and operate temporary lighting that will fulfill security and protection requirements without operating the entire system. Provide temporary lighting that will provide adequate illumination for construction operations and traffic conditions.
- v. Temporary Heat: Provide temporary heat required by construction activities for curing or drying of completed installations or for protection of installed construction from adverse effects of low temperatures or high humidity. Select safe equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce the ambient condition required and minimize consumption of energy.
- vi. Heating Facilities: Except where the Owner authorizes use of the permanent system, provide vented, self-contained, LP-gas or fuel-oil heaters with individual space thermostatic control.
- vii. Temporary Telephones: Provide temporary telephone service throughout the construction period for all personnel engaged in construction activities. Install telephone on a separate line for each temporary office and first-aid station.
 - (1) At each telephone, post a list of important telephone numbers.
- viii. Sanitary facilities include temporary toilets, wash facilities, and drinking-water fixtures. Comply with regulations and health codes for the type, number, location, operation, and maintenance of fixtures and facilities. Install where facilities will best serve the Project's needs.
 - (1) Provide toilet tissue, paper towels, paper cups, and similar disposable materials for each facility. Provide covered waste containers for used material.
- ix. Drinking-Water Facilities: Provide containerized, tap-dispenser, bottled-water drinking-water units, including paper supply.

c. SUPPORT FACILITIES INSTALLATION

- i. Locate field offices, storage sheds, and other temporary construction and support facilities for easy access.

- (1) Maintain support facilities until near Substantial Completion. Remove prior to Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to the Owner.
- ii. Storage and Fabrication Sheds: Install storage and fabrication sheds sized, furnished, and equipped to accommodate materials and equipment involved, including temporary utility service. Sheds may be open shelters or fully enclosed spaces within the building or elsewhere on-site.
- iii. Dewatering Facilities and Drains: For temporary drainage and dewatering facilities and operations not directly associated with construction activities included under individual Sections, comply with dewatering requirements of applicable Division 2 Sections. Where feasible, utilize the same facilities. Maintain the site, excavations, and construction free of water.
- iv. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities.
 - (1) Where heat is needed and the permanent building enclosure is not complete, provide temporary enclosures where there is no other provision for containment of heat. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.
 - (2) Install tarpaulins securely, with incombustible wood framing and other materials. Close openings of 25 sq. ft. (2.3 sq. m) or less with plywood or similar materials.
 - (3) Close openings through floor or roof decks and horizontal surfaces with load-bearing, wood-framed construction.
 - (4) Where temporary wood or plywood enclosure exceeds 100 sq. ft. (9.2 sq. m) in area, use UL-labeled, fire-retardant-treated material for framing and main sheathing.
- v. Temporary Lifts and Hoists: Provide facilities for hoisting materials and employees. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
- vi. Project Identification and Temporary Signs: Prepare project identification and other signs of size indicated. Install signs where indicated to inform the public and persons seeking entrance to the Project. Support on posts or framing of preservative-treated wood or steel. Do not permit installation of unauthorized signs.
 - (1) Project Identification Signs: Engage an experienced sign painter to apply graphics. Comply with details indicated.
 - (2) Temporary Signs: Prepare signs to provide directional information to construction personnel and visitors.
- vii. Temporary Exterior Lighting: Install exterior yard and sign lights so signs are visible when Work is being performed.
- viii. Collection and Disposal of Waste: Collect waste from construction areas and elsewhere daily. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not hold materials more than 7 days during normal weather or 3 days when the temperature is expected to rise above 80 deg F (27 deg C). Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material lawfully.
- ix. Rodent and Pest Control: Before deep foundation work has been completed, retain a local exterminator or pest control company to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests. Employ this service to perform extermination and control procedures at regular intervals so the Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using

environmentally safe materials.

- x. Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate. Cover finished permanent stairs with a protective covering of plywood or similar material so finishes will be undamaged at the time of acceptance.

d. SECURITY AND PROTECTION FACILITIES INSTALLATION

- i. Except for use of permanent fire protection as soon as available, do not change over from use of temporary security and protection facilities to permanent facilities until Substantial Completion, or longer, as requested by the Architect.
- ii. Temporary Fire Protection: Until fire-protection needs are supplied by permanent facilities, install and maintain temporary fire-protection facilities of the types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 10 "Standard for Portable Fire Extinguishers" and NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations."
 - (1) Locate fire extinguishers where convenient and effective for their intended purpose, but not less than one extinguisher on each floor at or near each usable stairwell.
 - (2) Store combustible materials in containers in fire-safe locations.
 - (3) Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire-protection facilities, stairways, and other access routes for fighting fires. Prohibit smoking in hazardous fire-exposure areas.
 - (4) Provide supervision of welding operations, combustion-type temporary heating units, and similar sources of fire ignition.
- iii. Permanent Fire Protection: At the earliest feasible date in each area of the Project, complete installation of the permanent fire-protection facility, including connected services, and place into operation and use. Instruct key personnel on use of facilities.
- iv. Barricades, Warning Signs, and Lights: Comply with standards and code requirements for erection of structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and the public of the hazard being protected against. Where appropriate and needed, provide lighting, including flashing red or amber lights.
- v. Enclosure Fence: Before excavation begins, install an enclosure fence with entrance gates. Locate where indicated or enclose the entire site or the portion determined sufficient to accommodate construction operations. Install in a manner that will prevent people, dogs, and other animals from easily entering the site, except by the entrance gates.
 - (1) Provide open-mesh, orange plastic safety fencing with posts.
- vi. Security Enclosure and Lockup: Install substantial temporary enclosure of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.
 - (1) Storage: Where materials and equipment must be stored, and are of value or attractive for theft, provide a secure lockup. Enforce discipline in connection with the installation and release of material to minimize the opportunity for theft and vandalism.
- vii. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways, and subsoil might be contaminated or polluted or that other undesirable effects might result. Avoid use of tools and equipment that produce harmful noise. Restrict use of noise-making tools and equipment to hours that will minimize complaints from persons or firms near the site.

e. OPERATION, TERMINATION, AND REMOVAL

- i. Supervision: Enforce strict discipline in use of temporary facilities. Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse.
- ii. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.
 - (1) Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
 - (2) Protection: Prevent water-filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.
- iii. Termination and Removal: Unless the Architect requests that it be maintained longer, remove each temporary facility when the need has ended, when replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with the temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 - (1) Materials and facilities that constitute temporary facilities are the Contractor's property. The Owner reserves the right to take possession of project identification signs.
 - (2) At Substantial Completion, clean and renovate permanent facilities used during the construction period including, but not limited to, the following:
 - (a) Replace air filters and clean inside of ductwork and housings.
 - (b) Replace significantly worn parts and parts subject to unusual operating conditions.
 - (c) Replace lamps burned out or noticeably dimmed by hours of use.

END OF SECTION 015000

DIVISION 1 - GENERAL REQUIREMENTS
SECTION 015850 - PROJECT SIGNS

PART I. GENERAL

A. SECTION INCLUDES

1. Project identification sign.

B. QUALITY ASSURANCE

1. Design sign and structure to withstand 70 miles/hr wind velocity.
2. Sign Painter: Experienced as a professional sign painter for minimum three years.
3. Finishes, Painting: Adequate to withstand weathering, fading and chipping for duration of construction.

C. SUBMITTALS

1. See Section 013000 - Submittals for submittal procedures.

PART II. PRODUCTS

A. SIGN MATERIALS

1. Structure and Framing: New, wood, structurally adequate.
2. Sign Surfaces: Exterior grade plywood with medium density overlay, minimum 3/4 inch thick, standard large sizes to minimize joints.
3. Rough Hardware: Galvanized.
4. Paint and Primers: Exterior quality, two coats; sign background of color as selected.
5. Lettering: Exterior quality paint, contrasting colors.

B. PROJECT IDENTIFICATION SIGN

1. One at each site, painted sign, 48 sq. ft. area, bottom 6 feet above ground.
2. Content:
 - a. Project number, title, logo and name of Owner as indicated on Contract Documents.
 - b. Names and titles of authorities.
 - c. Names and titles of Architect and Consultants.
 - d. Name of Prime Contractor.
3. Graphic Design: Colors, Style of Lettering: Designated by Architect.

PART III. EXECUTION:

A. INSTALLATION

1. Install project identification sign within 30 days after date fixed by Notice to Proceed.
2. Erect at location of high public visibility adjacent to main entrance to site.
3. Install sign surface plumb and level, with butt joints. Anchor securely.

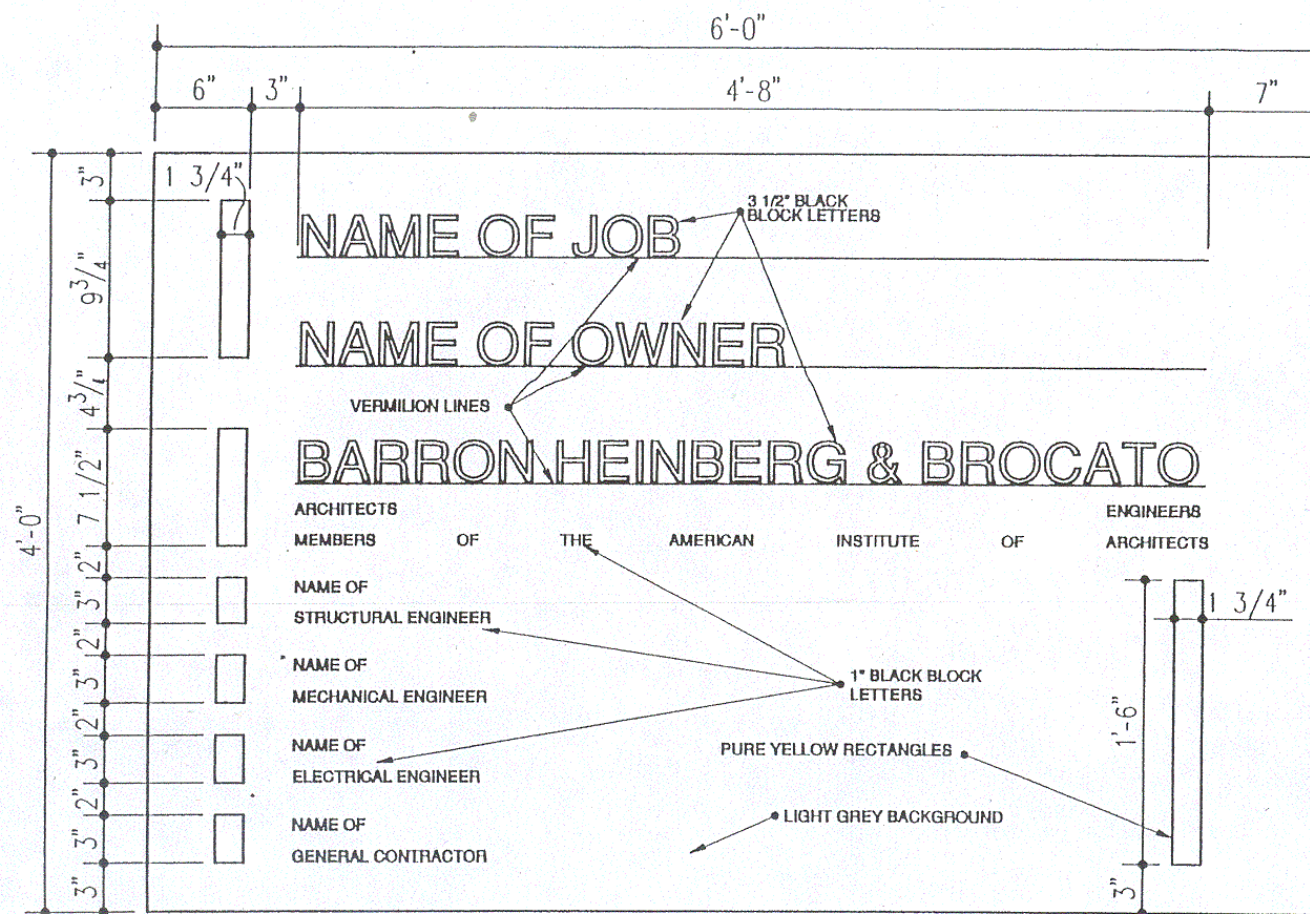
B. MAINTENANCE

1. Maintain signs and supports clean, repair deterioration and damage.

C. REMOVAL

1. Remove signs, framing, supports and foundations at completion of Project and restore the area.

END OF SECTION



Project Identification Sign (Provide one at location as directed by Architect)

DIVISION 1 - GENERAL REQUIREMENTS
SECTION 016000 - MATERIALS AND EQUIPMENT

PART 1 GENERAL

a. RELATED DOCUMENTS

- i. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

b. SUMMARY

- i. This Section includes administrative and procedural requirements governing the Contractor's selection of products for use in the Project.

c. DEFINITIONS

- i. Definitions used in this Article are not intended to change the meaning of other terms used in the Contract Documents, such as "specialties," "systems," "structure," "finishes," "accessories," and similar terms. Such terms are self-explanatory and have well-recognized meanings in the construction industry.
 - (1) "Products" are items purchased for incorporation in the Work, whether purchased for the Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - (a) "Named Products" are items identified by the manufacturer's product name, including make or model number or other designation, shown or listed in the manufacturer's published product literature that is current as of the date of the Contract Documents.
 - (2) "Materials" are products substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.
 - (3) "Equipment" is a product with operational parts, whether motorized or manually operated, that requires service connections, such as wiring or piping.

d. SUBMITTALS

- i. Product List: Prepare a list showing products specified in tabular form acceptable to the Architect. Include generic names of products required. Include the manufacturer's name and proprietary product names for each item listed.
 - (1) Coordinate product list with the Contractor's Construction Schedule and the Schedule of Submittals.
 - (2) Form: Prepare product list with information on each item tabulated under the following column headings:
 - (a) Related Specification Section number.
 - (b) Generic name used in Contract Documents.
 - (c) Proprietary name, model number, and similar designations.
 - (d) Manufacturer's name and address.

- (e) Supplier's name and address.
 - (f) Installer's name and address.
 - (g) Projected delivery date or time span of delivery period.
- (3) Completed List: Within 60 days after date of commencement of the Work, submit 3 copies of the completed product list. Provide a written explanation for omissions of data and for known variations from Contract requirements.
- (4) Architect's Action: The Architect will respond in writing to Contractor within 2 weeks of receipt of the completed product list. No response within this period constitutes no objection to listed manufacturers or products but does not constitute a waiver of the requirement that products comply with Contract Documents. The Architect's response will include a list of unacceptable product selections, containing a brief explanation of reasons for this action.

e. QUALITY ASSURANCE

- i. Source Limitations: To the fullest extent possible, provide products of the same kind from a single source.
- (1) When specified products are available only from sources that do not, or cannot, produce a quantity adequate to complete project requirements in a timely manner, consult with the Architect to determine the most important product qualities before proceeding. Qualities may include attributes, such as visual appearance, strength, durability, or compatibility. When a determination has been made, select products from sources producing products that possess these qualities, to the fullest extent possible.
- ii. Compatibility of Options: When the Contractor is given the option of selecting between 2 or more products for use on the Project, the product selected shall be compatible with products previously selected, even if previously selected products were also options.
- iii. Nameplates: Except for required labels and operating data, do not attach or imprint manufacturers or producer's nameplates or trademarks on exposed surfaces of products that will be exposed to view in occupied spaces or on the exterior.
- (1) Labels: Locate required product labels and stamps on concealed surfaces or, where required for observation after installation, on accessible surfaces that are not conspicuous.
- (2) Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on an easily accessible surface that is inconspicuous in occupied spaces. The nameplate shall contain the following information and other essential operating data:
- (a) Name of product and manufacturer.
 - (b) Model and serial number.
 - (c) Capacity.
 - (d) Speed.
 - (e) Ratings.

f. PRODUCT DELIVERY, STORAGE, AND HANDLING

- i. Deliver, store, and handle products according to the manufacturer's recommendations, using means and methods that will prevent damage, deterioration, and loss, including theft.

- (1) Schedule delivery to minimize long-term storage at the site and to prevent overcrowding of construction spaces.
- (2) Coordinate delivery with installation time to assure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
- (3) Deliver products to the site in an undamaged condition in the manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
- (4) Inspect products upon delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
- (5) Store products at the site in a manner that will facilitate inspection and measurement of quantity or counting of units.
- (6) Store heavy materials away from the Project structure in a manner that will not endanger the supporting construction.
- (7) Store products subject to damage by the elements above ground, under cover in a weather tight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.

PART 2. - PRODUCTS

a. PRODUCT SELECTION

- i. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, new at the time of installation.
 - (1) Provide products complete with accessories, trim, finish, safety guards, and other devices and details needed for a complete installation and the intended use and effect.
 - (2) Standard Products: Where available, provide standard products of types that have been produced and used successfully in similar situations on other projects.
- ii. Product Selection Procedures: The Contract Documents and governing regulations govern product selection. Procedures governing product selection include the following:
 - (1) Proprietary Specification Requirements: Where Specifications name only a single product or manufacturer, provide the product indicated. No substitutions will be permitted.
 - (2) Semi proprietary Specification Requirements: Where Specifications name 2 or more products or manufacturers, provide 1 of the products indicated. No substitutions will be permitted.
 - (a) Where Specifications specify products or manufacturers by name, accompanied by the term "or equal" or "or approved equal," comply with the Contract Document provisions concerning "substitutions" to obtain approval for use of an unnamed product.
 - (3) Nonproprietary Specifications: When Specifications list products or manufacturers that are available and may be incorporated in the Work, but do not restrict the Contractor to use of these products only, the Contractor may propose any available product that complies with Contract requirements. Comply with Contract Document provisions concerning "substitutions" to obtain approval for use of an unnamed

product.

- (4) Descriptive Specification Requirements: Where Specifications describe a product or assembly, listing exact characteristics required, with or without use of a brand or trade name, provide a product or assembly that provides the characteristics and otherwise complies with Contract requirements.
- (5) Performance Specification Requirements: Where Specifications require compliance with performance requirements, provide products that comply with these requirements and are recommended by the manufacturer for the application indicated.

- (a) Manufacturer's recommendations may be contained in published product literature or by the manufacturer's certification of performance.

- (6) Compliance with Standards, Codes, and Regulations: Where Specifications only require compliance with an imposed code, standard, or regulation, select a product that complies with the standards, codes, or regulations specified.
- (7) Visual Matching: Where Specifications require matching an established Sample, the Architect's decision will be final on whether a proposed product matches satisfactorily.

- (a) Where no product available within the specified category matches satisfactorily and complies with other specified requirements, comply with provisions of the Contract Documents concerning "substitutions" for selection of a matching product in another product category.

- (8) Visual Selection: Where specified product requirements include the phrase "... as selected from manufacturer's standard colors, patterns, textures ..." or a similar phrase, select a product and manufacturer that complies with other specified requirements. The Architect will select the color, pattern, and texture from the product line selected.
- (9) Allowances: Refer to individual Specification Sections and "Allowance" provisions in Division 1 for allowances that control product selection and for procedures required for processing such selections.
- (10) Drawings and Specifications: In the case of inconsistency between Drawings and Specifications or within either Document not clarified by addendum, the better quality or greater quantity of Work shall be provided in accordance with the Architect's interpretation.

b. INSTALLATION OF PRODUCTS

- i. Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated. Anchor each product securely in place, accurately located and aligned with other Work.

- (1) Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

END OF SECTION 016000

DIVISION 1 - GENERAL REQUIREMENTS
SECTION 016310 - SUBSTITUTIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for handling requests for substitutions made after award of the Contract.

1.3 DEFINITIONS

- A. Definitions in this Article do not change or modify the meaning of other terms used in the Contract Documents.
- B. Substitutions: Changes in products, materials, equipment, and methods of construction required by the Contract Documents proposed by the Contractor after award of the Contract are considered to be requests for substitutions. The following are not considered to be requests for substitutions:
 - 1. Substitutions requested during the bidding period, and accepted by Addendum prior to award of the Contract, are included in the Contract Documents and are not subject to requirements specified in this Section for substitutions.
 - 2. Revisions to the Contract Documents requested by the Owner or Architect.
 - 3. Specified options of products and construction methods included in the Contract Documents.
 - 4. The Contractor's determination of and compliance with governing regulations and orders issued by governing authorities.

1.4 SUBMITTALS

- A. Substitution Request Submittal: The Architect will consider requests for substitution if received within 60 days after commencement of the Work. Requests received more than 60 days after commencement of the Work may be considered or rejected at the discretion of the Architect.
 - 1. Submit 3 copies of each request for substitution for consideration. Submit requests in the form and according to procedures required for change-order proposals.
 - 2. Identify the product or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers.
 - 3. Provide complete documentation showing compliance with the requirements for substitutions, and the following information, as appropriate:
 - a. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by the Owner and separate contractors that will be necessary to accommodate the proposed substitution.
 - b. A detailed comparison of significant qualities of the proposed substitution with

- those of the Work specified. Significant qualities may include elements, such as performance, weight, size, durability, and visual effect.
- c. Product Data, including Drawings and descriptions of products and fabrication and installation procedures.
 - d. Samples, where applicable or requested.
 - e. A statement indicating the substitution's effect on the Contractor's Construction Schedule compared to the schedule without approval of the substitution. Indicate the effect of the proposed substitution on overall Contract Time.
 - f. Cost information, including a proposal of the net change, if any in the Contract Sum.
 - g. The Contractor's certification that the proposed substitution conforms to requirements in the Contract Documents in every respect and is appropriate for the applications indicated.
 - h. The Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of the failure of the substitution to perform adequately.
4. Architect's Action: If necessary, the Architect will request additional information or documentation for evaluation within one week of receipt of a request for substitution. The Architect will notify the Contractor of acceptance or rejection of the substitution within 2 weeks of receipt of the request, or one week of receipt of additional information or documentation, whichever is later. Acceptance will be in the form of a change order.
- a. Use the product specified if the Architect cannot make a decision on the use of a proposed substitute within the time allocated.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

- A. Conditions: The Architect will receive and consider the Contractor's request for substitution when one or more of the following conditions are satisfied, as determined by the Architect. If the following conditions are not satisfied, the Architect will return the requests without action except to record noncompliance with these requirements.
1. Extensive revisions to the Contract Documents are not required.
 2. Proposed changes are in keeping with the general intent of the Contract Documents.
 3. The request is timely, fully documented, and properly submitted.
 4. The specified product or method of construction cannot be provided within the Contract Time. The Architect will not consider the request if the product or method cannot be provided as a result of failure to pursue the Work promptly or coordinate activities properly.
 5. The request is directly related to an "or-equal" clause or similar language in the Contract Documents.
 6. The requested substitution offers the Owner a substantial advantage, in cost, time, energy conservation, or other considerations, after deducting additional responsibilities the Owner must assume. The Owner's additional responsibilities may

include compensation to the Architect for redesign and evaluation services, increased cost of other construction by the Owner, and similar considerations.

7. The specified product or method of construction cannot receive necessary approval by a governing authority, and the requested substitution can be approved.
8. The specified product or method of construction cannot be provided in a manner that is compatible with other materials and where the Contractor certifies that the substitution will overcome the incompatibility.
9. The specified product or method of construction cannot be coordinated with other materials and where the Contractor certifies that the proposed substitution can be coordinated.
10. The specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor certifies that the proposed substitution provides the required warranty.
11. Where a proposed substitution involves more than one prime contractor, each contractor shall cooperate with the other contractors involved to coordinate the Work, provide uniformity and consistency, and assure compatibility of products.

B. By making requests for substitutions, the Contractor:

1. Represents that the Contractor has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to that specified.
2. Represents that the Contractor will provide the same warranty for the substitution that the Contractor would for that specified.
3. Certifies that the cost data presented is complete and includes all related costs under this Contract except the Architect's redesign costs, and waives all claims for additional costs related to the substitution which subsequently become apparent; and
4. Will coordinate the installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects.

C. The Contractor's submittal and the Architect's acceptance of Shop Drawings, Product Data, or Samples for construction activities not complying with the Contract Documents do not constitute an acceptable or valid request for substitution, nor do they constitute approval.

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 016310

DIVISION 1 - GENERAL REQUIREMENTS
SECTION 017000 - CONTRACT CLOSEOUT

PART I GENERAL

a. RELATED DOCUMENTS

- i. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

b. SUMMARY

- i. This Section includes administrative and procedural requirements for contract closeout including, but not limited to, the following:
 - (1) Inspection procedures.
 - (2) Project record document submittal.
 - (3) Operation and maintenance manual submittal.
 - (4) Submittal of warranties.
 - (5) Final cleaning.
- ii. Closeout requirements for specific construction activities are included in the appropriate Sections in Divisions 2 through 16.

c. SUBSTANTIAL COMPLETION

- i. Preliminary Procedures: Before requesting inspection for certification of Substantial Completion, complete the following. List exceptions in the request.
 - (1) In the Application for Payment that coincides with, or first follows, the date Substantial Completion is claimed, show 100 percent completion for the portion of the Work claimed as substantially complete.
 - (a) Include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Sum.
 - (b) If 100 percent completion cannot be shown, include a list of incomplete items (Punch List), the value of incomplete construction, and reasons the Work is not complete.
 - (2) Advise the Owner of pending insurance changeover requirements.
 - (3) Submit specific warranties, workmanship bonds, maintenance agreements, final certifications, and similar documents.
 - (4) Obtain and submit releases enabling the Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - (5) Submit record drawings, maintenance manuals, final project photographs, damage or settlement surveys, property surveys, and similar final record information.
 - (6) Deliver tools, spare parts, extra stock, and similar items.
 - (7) Make final changeover of permanent locks and transmit keys to the Owner. Advise

- the Owner's personnel of changeover in security provisions.
 - (8) Complete startup testing of systems and instruction of the Owner's operation and maintenance personnel. Discontinue and remove temporary facilities from the site, along with mockups, construction tools, and similar elements.
 - (9) Complete final cleanup requirements, including touchup painting.
 - (10) Touch up and otherwise repair and restore marred, exposed finishes.
- ii. Inspection Procedures: On receipt of a request for inspection, the Architect will either proceed with inspection or advise the Contractor of unfilled requirements. The Architect will prepare the Certificate of Substantial Completion following inspection or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.
- (1) If upon inspection, the Architect finds the list of incomplete items (Punch List) incomplete. The architect will terminate the inspection and charge the contractor for time and travel.
 - (2) The Architect will repeat inspection when requested and assured that the Work is substantially complete.
 - (3) If upon reinspections, the work is not found to be substantially complete in accordance with the Architect's instructions, the Contractor shall bear the cost of reinspection.
 - (4) Results of the completed inspection will form the basis of requirements for final acceptance.
- d. FINAL ACCEPTANCE
- i. Preliminary Procedures: Before requesting final inspection for certification of final acceptance and final payment, complete the following. List exceptions in the request.
- (1) Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include insurance certificates for products and completed operations where required.
 - (2) Submit an updated final statement, accounting for final additional changes to the Contract Sum.
 - (3) Submit a certified copy of the Architect's final inspection list of items to be completed or corrected, endorsed and dated by the Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance and shall be endorsed and dated by the Architect.
 - (4) Submit final meter readings for utilities, a measured record of stored fuel, and similar data as of the date of Substantial Completion or when the Owner took possession of and assumed responsibility for corresponding elements of the Work.
 - (5) Submit consent of surety to final payment.
 - (6) Submit a final liquidated damages settlement statement.
 - (7) Submit evidence of final, continuing insurance coverage complying with insurance requirements.
- ii. Reinspection Procedure: The Architect will reinspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed, except for items whose completion is delayed under circumstances acceptable to the Architect.

- (1) Upon completion of reinspection, the Architect will prepare a certificate of final acceptance. If the Work is incomplete, the Architect will advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.
- (2) If necessary, reinspection will be repeated and the Contractor shall bear the cost of the reinspection.

e. RECORD DOCUMENT SUBMITTALS

- i. General: Do not use record documents for construction purposes. Protect record documents from deterioration and loss in a secure, fire-resistant location. Provide access to record documents for the Architect's reference during normal working hours.
- ii. Record Drawings: Maintain a clean, undamaged set of blue or black line white-prints of Contract Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark which drawing is most capable of showing conditions fully and accurately. Where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.
 - (1) Mark record sets with red erasable pencil. Use other colors to distinguish between variations in separate categories of the Work.
 - (2) Mark new information that is important to the Owner but was not shown on Contract Drawings or Shop Drawings.
 - (3) Note related change-order numbers where applicable.
 - (4) Organize record drawing sheets into manageable sets. Bind sets with durable-paper cover sheets; print suitable titles, dates, and other identification on the cover of each set.
- iii. Miscellaneous Record Submittals: Refer to other Specification Sections for requirements of miscellaneous record keeping and submittals in connection with actual performance of the Work. Immediately prior to the date or dates of Substantial Completion, complete miscellaneous records and place in good order. Identify miscellaneous records properly and bind or file, ready for continued use and reference. Submit to the Architect for the Owner's records.
- iv. Maintenance Manuals: Organize operation and maintenance data into suitable sets of manageable size. Bind properly indexed data in individual, heavy-duty, 2-inch (51-mm), 3-ring, vinyl-covered binders, with pocket folders for folded sheet information. Mark appropriate identification on front and spine of each binder. Include the following types of information:
 - (1) Emergency instructions.
 - (2) Spare parts list.
 - (3) Copies of warranties.
 - (4) Wiring diagrams.
 - (5) Recommended "turn-around" cycles.
 - (6) Inspection procedures.
 - (7) Shop Drawings and Product Data.

(8) Fixture lamping schedule.

PART 2. - PRODUCTS (Not Applicable)

PART 3. - EXECUTION

a. CLOSEOUT PROCEDURES

- i. Operation and Maintenance Instructions: Arrange for each Installer of equipment that requires regular maintenance to meet with the Owner's personnel to provide instruction in proper operation and maintenance. Provide instruction by manufacturer's representatives if installers are not experienced in operation and maintenance procedures. Include a detailed review of the following items:
 - (a) Maintenance manuals.
 - (b) Record documents.
 - (c) Spare parts and materials.
 - (d) Tools.
 - (e) Lubricants.
 - (f) Fuels.
 - (g) Identification systems.
 - (h) Control sequences.
 - (i) Hazards.
 - (j) Cleaning.
 - (k) Warranties and bonds.
 - (l) Maintenance agreements and similar continuing commitments.
- ii. As part of instruction for operating equipment, demonstrate the following procedures:
 - (1) Startup.
 - (2) Shutdown.
 - (3) Emergency operations.
 - (4) Noise and vibration adjustments.
 - (5) Safety procedures.
 - (6) Economy and efficiency adjustments.
 - (7) Effective energy utilization.

FINAL CLEANING

- i. General: The General Conditions require general cleaning during construction. Regular site cleaning is included in Division 1 Section "Construction Facilities and Temporary Controls."
- ii. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with manufacturer's instructions.
 - (1) Complete the following cleaning operations before requesting inspection for certification of Substantial Completion.
 - (a) Remove labels that are not permanent labels.
 - (b) Clean transparent materials, including mirrors and glass in doors and windows.

Remove glazing compounds and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.

- (c) Clean exposed exterior and interior hard-surfaced finishes to a dust-free condition, free of stains, films, and similar foreign substances. Restore reflective surfaces to their original condition. Leave concrete floors broom clean. Vacuum carpeted surfaces.
- (d) Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.
- (e) Clean the site, including landscape development areas, of rubbish, litter, and other foreign substances. Sweep paved areas broom clean; remove stains, spills, and other foreign deposits. Rake grounds that are neither paved nor planted to a smooth, even-textured surface.

iii. Removal of Protection: Remove temporary protection and facilities installed for protection of the Work during construction.

iv. Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from the site and dispose of lawfully.

- (1) Where extra materials of value remain after completion of associated Work, they become the Owner's property. Dispose of these materials as directed by the Owner.

END OF SECTION 01700

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 017329 - CUTTING AND PATCHING

PART I. - GENERAL

A. RELATED DOCUMENTS

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

B. SUMMARY

1. This Section includes administrative and procedural requirements for cutting and patching.
 - a. Refer to other Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.
 - (1) Requirements of this Section apply to mechanical and electrical installations. Refer to Divisions 20 through 28 Sections for other requirements and limitations applicable to cutting and patching mechanical and electrical installations.

C. SUBMITTALS

1. Cutting and Patching Proposal: Where cutting and patching will have a significant affect on the finished work, submit a proposal describing procedures well in advance of the time cutting and patching will be performed if the Owner requires approval of these procedures before proceeding. Request approval to proceed. Include the following information, as applicable, in the proposal:
 - a. Describe the extent of cutting and patching required. Show how it will be performed and indicate why it cannot be avoided.
 - b. Describe anticipated results in terms of changes to existing construction. Include changes to structural elements and operating components as well as changes in the building's appearance and other significant visual elements.
 - c. List products to be used and firms or entities that will perform Work.
 - d. Indicate dates when cutting and patching will be performed.
 - e. Utilities: List utilities that cutting and patching procedures will disturb or affect. List utilities that will be relocated and those that will be temporarily out-of-service. Indicate how long service will be disrupted.
 - f. Where cutting and patching involves adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with the original structure.
 - g. Approval by the Architect to proceed with cutting and patching does not waive the Architect's right to later require complete removal and replacement of unsatisfactory work.

D. QUALITY ASSURANCE

1. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would change their load-carrying capacity or load-deflection ratio.
2. Operational Limitations: Do not cut and patch operating elements or related components in a manner that would result in reducing their capacity to perform as intended. Do not cut and patch operating elements or related components in a manner that would result in increased maintenance or decreased operational life or safety.
3. Visual Requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in the Architect's opinion, reduce the building's aesthetic qualities.

Do not cut and patch construction in a manner that would result in visual evidence of cutting and patching. Remove and replace construction cut and patched in a visually unsatisfactory manner.

- a. If possible retain the original Installer or fabricator to cut and patch exposed Work. If it is impossible to engage the original Installer or fabricator, engage another recognized experienced and specialized firm.

E. WARRANTY

1. Existing Warranties: Replace, patch, and repair material and surfaces cut or damaged by methods and with materials in such a manner as not to void any warranties required or existing.

PART II. - PRODUCTS

A. MATERIALS, GENERAL

1. Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible if identical materials are unavailable or cannot be used. Use materials whose installed performance will equal or surpass that of existing materials.

PART III. - EXECUTION

A. INSPECTION

1. Examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed before cutting. If unsafe or unsatisfactory conditions are encountered, take corrective action before proceeding.
 - a. Before proceeding, meet at the Project Site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

B. PREPARATION

1. Temporary Support: Provide temporary support of work to be cut.
2. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Project that might be exposed during cutting and patching operations.
3. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
4. Avoid cutting existing pipe, conduit, or ductwork serving the building but scheduled to be removed or relocated until provisions have been made to bypass them.

C. PERFORMANCE

1. General: Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay.
 - a. Cut existing construction to provide for installation of other components or performance of other construction activities and the subsequent fitting and patching required to restore surfaces to their original condition.
2. Cutting: Cut existing construction using methods least likely to damage elements retained or adjoining construction. Where possible, review proposed procedures with the original Installer; comply with the original Installer's recommendations.

- a. In general, where cutting, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - b. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
 - c. Cut through concrete and masonry using a cutting machine, such as a Carborundum saw or a diamond-core drill.
 - d. Comply with requirements of applicable Division 2 Sections where cutting and patching requires excavating and backfilling.
 - e. Where services are required to be removed, relocated, or abandoned, by-pass utility services, such as pipe or conduit, before cutting. Cut-off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal the remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after by-passing and cutting.
3. Patching: Patch with durable seams that are as invisible as possible. Comply with specified tolerances.
 - a. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.
 - b. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 - c. Where removing walls or partitions extends one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform color and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - (1) Where patching occurs in a smooth painted surface, extend final paint coat over entire unbroken surface containing the patch after the area has received primer and second coat.
 - d. Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.

D. CLEANING

1. Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar items. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition.

END OF SECTION

DIVISION 1 - GENERAL REQUIREMENTS
SECTION 017400 - WARRANTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for warranties required by the Contract Documents, including manufacturer's standard warranties on products and special warranties.

1. Refer to the General Conditions for terms of the Contractor's period for correction of the Work.

- B. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products. Manufacturer's disclaimers and limitations on product warranties do not relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

1.3 DEFINITIONS

- A. Standard product warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.
- B. Special warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

1.4 WARRANTY REQUIREMENTS

- A. Related Damages and Losses: When correcting failed or damaged warranted construction, remove and replace construction that has been damaged as a result of such failure or must be removed and replaced to provide access for correction of warranted construction.
- B. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
- C. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of the Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.
- D. Owner's Recourse: Expressed warranties made to the Owner are in addition to implied warranties and shall not limit the duties, obligations, rights, and remedies otherwise available under the law. Expressed warranty periods shall not be interpreted as limitations on the time in which the Owner can enforce such other duties, obligations, rights, or remedies.

1. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selection to products with warranties not in conflict with requirements of the Contract Documents.

- E. Where the Contract Documents require a special warranty, or similar commitment on the Work or part of the Work, the Owner reserves the right to refuse to accept the Work, until the Contractor presents evidence that entities required to countersign such commitments are willing to do so.

1.5 SUBMITTALS

- A. Submit written warranties to the Architect prior to the date certified for Substantial Completion. If the Architect's Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, or a designated portion of the Work, submit written warranties upon request of the Architect.

1. When a designated portion of the Work is completed and occupied or used by the Owner, by separate agreement with the Contractor during the construction period, submit properly executed warranties to the Architect within 15 days of completion of that designated portion of the Work.
- B. When the Contract Documents require the Contractor, or the Contractor and a subcontractor, supplier or manufacturer to execute a special warranty, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Owner, through the Architect, for approval prior to final execution.
- C. Form of Submittal: At Final Completion compile 2 copies of each required warranty properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.
- D. Bind warranties and bonds in heavy-duty, commercial-quality, durable 3-ring, vinyl-covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch (115-by-280-mm) paper.
 1. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product, and the name, address, and telephone number of the Installer.
 2. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project title or name, and name of the Contractor.
 3. When warranted construction requires operation and maintenance manuals, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 017400

DIVISION 2 – EXISTING CONDITIONS

SECTION 024123 - SELECTIVE SITE DEMOLITION

Part I. - GENERAL

A. RELATED DOCUMENTS

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. SUMMARY

1. This Section includes the following:
 - a. Demolition and removal of abandoned utilities.
 - b. Demolition and removal of existing paving.
 - c. Demolition and removal of selected site elements
 - d. Patching and repairs.

C. DEFINITIONS

1. Remove: Remove and legally dispose of items except those indicated to be reinstalled, salvaged, or to remain the Owner's property.
2. Remove and Reinstall: Remove items indicated; clean, service, and otherwise prepare them for reuse; store and protect against damage. Reinstall items in the same locations or in locations indicated.
3. Existing to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by the Architect, items may be removed to a suitable, protected storage location during selective demolition and then cleaned and reinstalled in their original locations.

D. MATERIALS OWNERSHIP

1. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain the Owner's property, demolished materials shall become the Contractor's property and shall be removed from the site with further disposition at the Contractor's option.

E. SUBMITTALS

1. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections, for information only, unless otherwise indicated.
2. Photographs or videotape, sufficiently detailed, of existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by selective demolition operations.

F. QUALITY ASSURANCE

1. Demolition Firm Qualifications: Engage an experienced firm that has successfully completed selective demolition Work similar to that indicated for this Project.
2. Regulatory Requirements: Comply with governing EPA notification regulations before starting selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

G. PROJECT CONDITIONS

1. Owner assumes no responsibility for actual condition of existing work to be selectively demolished.
 - a. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
2. Asbestos: It is not expected that asbestos will be encountered in the Work. If any materials suspected of containing asbestos are encountered, do not disturb the materials. Immediately notify the Architect and the Owner.
 - a. Asbestos will be removed by Owner's separate contractor before start of Work.
3. Storage or sale of removed items or materials on-site will not be permitted.

PART II. - PRODUCTS

A. REPAIR MATERIALS

1. Use repair materials identical to existing materials.
 - a. Where identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
 - b. Use materials whose installed performance equals or surpasses that of existing materials.

PART III. - EXECUTION

A. EXAMINATION

1. Verify that utilities have been disconnected and capped.
2. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
3. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.
4. Survey the condition of the site prior to bid.
5. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

B. UTILITY SERVICES

1. Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 - a. Do not interrupt existing utilities serving occupied or operating facilities, except when authorized in writing by Owner and authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and to governing authorities.
 - (1) Provide not less than 72 hours' notice to Owner if shutdown of service is required during changeover.
2. Utility Requirements: Locate, identify, disconnect, and seal or cap off utility services which are indicated to be selectively demolished.
 - a. Arrange to shut off indicated utilities with utility companies.

- b. Where utility services are required to be removed, relocated, or abandoned, provide bypass connections to maintain continuity of service to occupied or operating facilities before proceeding with selective demolition.
 - c. Cut off pipe or conduit below grade. Cap, valve, or plug and seal the remaining portion of pipe or conduit after bypassing.
3. Utility Requirements: Refer to Division 15 and 16 Sections for shutting off, disconnecting, removing, and sealing or capping utility services. Do not start selective demolition work until utility disconnecting and sealing have been completed and verified in writing.

C. PREPARATION

1. Conduct demolition operations and remove debris to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
 - a. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
2. Conduct demolition operations to prevent injury to people and damage to adjacent buildings and facilities to remain. Ensure safe passage of people around selective demolition area.
 - a. Protect existing site improvements, appurtenances, and landscaping to remain.
 - b. Erect a plainly visible fence around drip line of individual trees or around perimeter drip line of groups of trees to remain.

D. POLLUTION CONTROLS

1. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
2. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before start of selective demolition.

E. SELECTIVE DEMOLITION

1. Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete Work within limitations of governing regulations and as follows:
 - a. Proceed with selective demolition systematically.
 - b. Use cutting methods least likely to damage construction to remain or adjoining construction. To minimize disturbance of adjacent surfaces, use power tools designed for sawing or grinding, not hammering and chopping.
 - c. Dispose of demolished items and materials promptly. On-site storage or sale of removed items is prohibited.
 - d. Return elements of construction and surfaces to remain to condition existing before start of selective demolition operations.
2. Demolish concrete and masonry in small sections. Cut concrete and masonry at junctures with construction to remain, using power-driven masonry saw or hand tools; do not use power-driven impact tools.
3. Break up and remove concrete slabs on grade, unless otherwise shown to remain.
4. Remove abandoned foundations and utilities.

F. PATCHING AND REPAIRS

1. Promptly patch and repair holes and damaged surfaces caused to adjacent construction by selective demolition operations.
2. Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.
 - a. Completely fill holes and depressions where below grade work is removed with approved fill material, placed and compacted in 8" maximum loose lifts according to requirements specified in Division 31, EARTHWORK.

G. DISPOSAL OF DEMOLISHED MATERIALS

1. General: Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.
2. Burning: Do not burn demolished materials.
3. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

H. CLEANING

1. Sweep the adjacent paving and surfaces broom clean on completion of selective demolition operation.

END OF SECTION

DIVISION 3 - CONCRETE
SECTION 031000 - CONCRETE FORMING AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Form-facing materials.

B. Related Requirements:

1. Section 321313 "Concrete Paving" for formwork related to concrete pavement and walks.

1.2 DEFINITIONS

A. Form-Facing Material: The temporary form materials that come in direct contact with the concrete as part of the formwork components in supporting the concrete while the concrete is setting and gaining sufficient strength to be self-supporting. The most common materials are steel, aluminum, and wood.

B. Formwork: The total system of support of freshly placed concrete, including the mold or sheathing that contacts the concrete, as well as supporting members, hardware, and necessary bracing.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Detailing fabrication, assembly, and support of forms.

1. Indicate dimension and locations of construction and movement joints required to construct the structure in accordance with ACI 301.

- a. Location of construction joints is subject to approval of Architect.

1.4 INFORMATIONAL SUBMITTALS

A. Research Reports: For insulating concrete forms indicating compliance with ICC's Acceptance Criteria AC308.

B. Field quality-control reports.

C. Qualification Statements: For testing and inspection agency.

1.5 QUALITY ASSURANCE

A. Testing and Inspection Agency Qualifications: An independent agency, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Concrete Formwork: Design, engineer, erect, shore, brace, and maintain formwork, shores, and reshores in accordance with ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads, so that resulting concrete conforms to the required shapes, lines, and dimensions.

1. Design wood panel forms in accordance with APA's "Concrete Forming Design/Construction Guide."
2. Design formwork to limit deflection of form-facing material to 1/240 of center-to-center spacing of supports.

2.2 FORM-FACING MATERIALS

A. As-Cast Surface Form-Facing Material:

1. Provide continuous, true, and smooth concrete surfaces.
2. Furnish in largest practicable sizes to minimize number of joints.
3. Acceptable Materials: As required to comply with Surface Finish designations specified in Section 033000 "Cast-in-Place Concrete, and as follows:
 - a. Plywood, metal, or other approved panel materials.
 - b. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
 - 1) APA Plyform Class I, B-B or better; mill oiled and edge sealed.

B. Concealed Surface Form-Facing Material: Lumber, plywood, metal, plastic, or another approved material.

1. Provide lumber dressed on at least two edges and one side for tight fit.

2.3 RELATED MATERIALS

A. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.

B. Form-Release Agent: Commercially formulated form-release agent that does not bond with, stain, or adversely affect concrete surfaces and does not impair subsequent treatments of concrete surfaces.

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

C. Form Ties: Factory-fabricated, removable or snap-off, glass-fiber-reinforced plastic or metal form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish units that leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
2. Furnish ties that, when removed, leave holes no larger than 1 inch in diameter in concrete surface.

D. Sealant: One-part moisture cure silicone sealant used with form liners.

PART 3 - EXECUTION

3.1 INSTALLATION OF FORMWORK

A. Comply with ACI 301.

B. Construct formwork, so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117 and to comply with the Surface Finish designations specified in Section 033000 "Cast-in-Place Concrete" for as-cast finishes.

C. Limit concrete surface irregularities as follows:

1. Surface Finish-3.0: ACI 117 Class A, 1/8 inch.

D. Construct forms tight enough to prevent loss of concrete mortar.

1. Minimize joints.
2. Exposed Concrete: Symmetrically align joints in forms.

E. Construct removable forms for easy removal without hammering or prying against concrete surfaces.

1. Provide crush or wrecking plates where stripping may damage cast-concrete surfaces.
2. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
3. Install keyways, reglets, recesses, and other accessories, for easy removal.

F. Do not use rust-stained, steel, form-facing material.

G. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces.

1. Provide and secure units to support screed strips
2. Use strike-off templates or compacting-type screeds.

H. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible.

1. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar.
2. Locate temporary openings in forms at inconspicuous locations.

I. Chamfer exterior corners and edges of permanently exposed concrete.

J. At construction joints, overlap forms onto previously placed concrete not less than 12 inches.

K. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work.

1. Determine sizes and locations from trades providing such items.
2. Obtain written approval of Architect prior to forming openings not indicated on Drawings.

L. Construction and Movement Joints:

1. Construct joints true to line with faces perpendicular to surface plane of concrete.
2. Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
3. Place joints perpendicular to main reinforcement.
4. Locate joints for beams, slabs, joists, and girders in the middle third of spans.
 - a. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
5. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
6. Space vertical joints in walls as indicated on Drawings.
 - a. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.

M. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection.

1. Locate ports and openings in bottom of vertical forms, in inconspicuous location, to allow flushing water to drain.
2. Close temporary ports and openings with tight-fitting panels, flush with inside face of form, and neatly fitted, so joints will not be apparent in exposed concrete surfaces.

N. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

O. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

P. Coat contact surfaces of forms with form-release agent, in accordance with manufacturer's written instructions, before placing reinforcement.

3.2 INSTALLATION OF EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete.

1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC 303.
3. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
4. Clean embedded items immediately prior to concrete placement.

3.3 REMOVING AND REUSING FORMS

A. Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations, and curing and protection operations need to be maintained.

1. Leave formwork for beam soffits, joists, slabs, and other structural elements that support weight of concrete in place until concrete has achieved its 28-day design compressive strength.
2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.

B. Clean and repair surfaces of forms to be reused in the Work.

1. Split, frayed, delaminated, or otherwise damaged form-facing material are unacceptable for exposed surfaces.
2. Apply new form-release agent.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints.

1. Align and secure joints to avoid offsets.
2. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4 INSTALLATION OF SHORING AND RESHORING

A. Comply with ACI 318 and ACI 301 for design, installation, and removal of shoring and reshoring.

1. Do not remove shoring or reshoring until measurement of slab tolerances is complete.

B. Plan sequence of removal of shores and reshore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.

END OF SECTION 031000

DIVISION 3 - CONCRETE

SECTION 032000 - CONCRETE REINFORCING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel reinforcement bars.
2. Welded-wire reinforcement.

B. Related Requirements:

1. Section 321313 "Concrete Paving" for reinforcing related to concrete pavement and walks.

1.2 ACTION SUBMITTALS

A. Product Data: For the following:

1. Each type of steel reinforcement.
2. Bar supports.

B. Shop Drawings: Comply with ACI SP-066:

1. Include placing drawings that detail fabrication, bending, and placement.
2. Include bar sizes, lengths, materials, grades, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, location of splices, lengths of lap splices, details of mechanical splice couplers, details of welding splices, tie spacing, hoop spacing, and supports for concrete reinforcement.
3. For structural thermal break insulated connection system, indicate general configuration, insulation dimensions, tension bars, compression pads, shear bars, and dimensions.

C. Construction Joint Layout: Indicate proposed construction joints required to build the structure.

1. Location of construction joints is subject to approval of Architect.

1.3 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

1. Store reinforcement to avoid contact with earth.

PART 2 - PRODUCTS

2.1 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A615/A615M, Grade 60, deformed.
- B. Plain-Steel Welded-Wire Reinforcement: ASTM A1064/A1064M, plain, fabricated from as-drawn steel wire into flat sheets.

2.2 REINFORCEMENT ACCESSORIES

- A. Joint Dowel Bars: ASTM A615/A615M, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs.
- B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place.
 - 1. Manufacture bar supports from steel wire, plastic, or precast concrete in accordance with CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
 - a. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs.
 - b. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire, all-plastic bar supports, or CRSI Class 2 stainless steel bar supports.
- C. Steel Tie Wire: ASTM A1064/A1064M, annealed steel, not less than 0.0508 inch in diameter.
 - 1. Finish: Plain.

2.3 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protection of In-Place Conditions:
 - 1. Do not cut or puncture vapor retarder.
 - 2. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

3.2 INSTALLATION OF STEEL REINFORCEMENT

- A. Comply with CRSI's "Manual of Standard Practice" for placing and supporting reinforcement.
- B. Accurately position, support, and secure reinforcement against displacement.

1. Locate and support reinforcement with bar supports to maintain minimum concrete cover.
 2. Do not tack weld crossing reinforcing bars.
- C. Preserve clearance between bars of not less than 1 inch, not less than one bar diameter, or not less than 1-1/3 times size of large aggregate, whichever is greater.
- D. Provide concrete coverage in accordance with ACI 318.
- E. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- F. Splices: Lap splices as indicated on Drawings.
1. Bars indicated to be continuous, and all vertical bars to be lapped not less than 36 bar diameters at splices, or 24 inches, whichever is greater.
 2. Stagger splices in accordance with ACI 318.
- G. Install welded-wire reinforcement in longest practicable lengths.
1. Support welded-wire reinforcement in accordance with CRSI "Manual of Standard Practice."
 - a. For reinforcement less than W4.0 or D4.0, continuous support spacing to not exceed 12 inches.
 2. Lap edges and ends of adjoining sheets at least one wire spacing plus 2 inches for plain wire and 8 inches for deformed wire.
 3. Offset laps of adjoining sheet widths to prevent continuous laps in either direction.
 4. Lace overlaps with wire.

3.3 JOINTS

- A. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
1. Place joints perpendicular to main reinforcement.
 2. Continue reinforcement across construction joints unless otherwise indicated.
 3. Do not continue reinforcement through sides of strip placements of floors and slabs.
- B. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length, to prevent concrete bonding to one side of joint.

3.4 INSTALLATION TOLERANCES

- A. Comply with ACI 117.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

END OF SECTION 032000

DIVISION 3 - CONCRETE
SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Concrete standards.
2. Concrete materials.
3. Admixtures.
4. Vapor retarders.
5. Floor and slab treatments.
6. Liquid floor treatments.
7. Curing materials.
8. Accessories.
9. Repair materials.
10. Concrete mixture materials.
11. Concrete mixture class types.
12. Concrete mixing.

B. Related Requirements:

1. Section 031000 "Concrete Forming and Accessories" for form-facing materials, form liners, insulating concrete forms, and waterstops.
2. Section 032000 "Concrete Reinforcing" for steel reinforcing bars and welded-wire
3. Section 312310 "Earthwork" for drainage fill under slabs-on-ground.
4. Section 321313 "Concrete Paving" for concrete pavement and walks.

1.2 DEFINITIONS

A. Cementitious Materials: Portland cement or blended hydraulic cement alone or in combination with one or more of the following:

1. Fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.

B. Water/Cementitious Materials (w/cm) Ratio: The ratio by weight of mixing water to cementitious materials.

1.3 ACTION SUBMITTALS

A. Product Data:

1. Portland cement.
2. Fly ash.
3. Aggregates.
4. Admixtures:
 - a. Include limitations of use. Admixtures that do not comply with reference ASTM International requirements must be submitted with test data for approval.

5. Vapor retarders.
6. Curing materials.
7. Joint fillers.
8. Repair materials.

B. Design Mixtures: For each concrete mixture, include the following:

1. Mixture identification.
2. Compressive strength at 28 days or other age as specified.
3. Compressive strength required at stages of construction.
4. Durability exposure classes for Exposure Categories F, S, W, and C.
5. Maximum w/cm ratio.
6. Calculated equilibrium and fresh density for lightweight concrete.
7. Slump or slump flow limit.
8. Air content.
9. Nominal maximum aggregate size.
10. Intended placement method.
11. Submit adjustments to design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant changes.

C. Shop Drawings:

1. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
 - a. Location of construction joints is subject to approval of the Architect.

D. Concrete Schedule: For each location of each class of concrete indicated in "Concrete Mixture Class Types" Article, including the following:

1. Concrete class designation.
2. Location within Project.
3. Exposure class designation.
4. Final finish for floors.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For the following:

1. Testing Agency: Include documentation indicating compliance with ASTM E329 or ASTM C1077 and copies of applicable ACI certificates for testing technicians or ACI Concrete Construction Special Inspector - MH, ASCC.

B. Material Certificates: For each of the following:

1. Cementitious materials.
2. Admixtures.
3. Curing compounds.
4. Bonding agents.
5. Vapor retarders.
6. Semirigid joint filler.
7. Joint-filler strips.
8. Repair materials.

C. Material Test Reports: For the following:

1. Portland cement.
2. Fly ash.
3. Aggregates.
4. Admixtures.

D. Research Reports:

1. For concrete admixtures in accordance with ICC's Acceptance Criteria AC198.
2. For sheet vapor retarder/termite barrier, showing compliance with ICC's Acceptance Criteria AC380.

E. Preconstruction Test Reports: For each mix design.

F. Field quality-control reports.

1.5 QUALITY ASSURANCE

- A. Ready-Mixed Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.
- B. Laboratory Testing Agency Qualifications: A testing agency qualified in accordance with ASTM C1077 and ASTM E329.
- C. Field Quality-Control Testing Agency Qualifications: An independent agency, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.

1.6 PRECONSTRUCTION TESTING

- A. Preconstruction Testing Service: Owner shall engage and pay for the services of a qualified testing agency to perform preconstruction testing on each concrete mixture.
 1. Include the following information in each test report:
 - a. Admixture dosage rates.
 - b. Slump.
 - c. Air content.
 - d. Seven-day compressive strength.
 - e. 28-day compressive strength.
 - f. Evaluation of permeability-reducing admixtures.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Comply with ASTM C94/C94M and ACI 301.

1.8 FIELD CONDITIONS

- A. Cold-Weather Placement: Comply with ACI 301 as follows:
 1. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

2. When air temperature has fallen to, or is expected to fall below 40 deg F during the protection period, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
3. Do not use frozen materials or materials containing ice or snow.
4. Do not place concrete in contact with surfaces less than 35 deg F, other than reinforcing steel.

B. Hot-Weather Placement: Comply with ACI 301 and ACI 305.1, and as follows:

1. Maintain concrete temperature at time of discharge to not exceed 90 deg F.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

PART 2 - PRODUCTS

2.1 CONCRETE STANDARDS

- A. ACI Publications: Comply with ACI 301 unless modified by requirements in the Contract Documents.

2.2 CONCRETE MATERIALS

A. Source Limitations:

1. Obtain all concrete mixtures from a single ready-mixed concrete manufacturer for entire Project.
2. Obtain each type of admixture from single source from single manufacturer.

B. Cementitious Materials:

1. Portland Cement: ASTM C150/C150M, Type I, gray.
2. FLY ASH: Will be allowed with a 20% by weight maximum proportion.

C. Normal-Weight Aggregates:

1. Coarse Aggregate: ASTM C33/C33M
2. Maximum Coarse-Aggregate Size:
 - a. 1" at slabs and beams on grade.
 - b. 3/4" at elevated slabs and beams.
 - c. 1-1/2" at footings.
3. Fine Aggregate: ASTM C33/C33M.

D. Lightweight Aggregate (If shown on Drawings): ASTM C330/C330M, 3/4-inch nominal maximum aggregate size.

2.3 ADMIXTURES

- A. Air-Entraining Admixture: ASTM C260/C260M.
- B. Chemical Admixtures: Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C494/C494M, Type A.
 2. Retarding Admixture: ASTM C494/C494M, Type B.
 3. Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type D.
 4. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F.
 5. High-Range, Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type G.
 6. Admixtures with special properties, with documentation of claimed performance enhancement, ASTM C494/C494M, Type S.
- a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- 1) **Euclid Chemical Company (The); a subsidiary of RPM International, Inc.**
 - 2) **GCP Applied Technologies Inc.**
 - 3) **MAPEI Corporation]**
 - 4) **Master Builders Solutions, brand of MBCC Group, a Sika company**
 - 5) **Sika Corporation**
- C. Mixing Water for Concrete Mixtures and Water Used to Make Ice: ASTM C1602/C1602M. Include documentation of compliance with limits for alkalis, sulfates, chlorides, or solids content of mixing water from Table 2 in ASTM C1602/C1602M.

2.4 VAPOR RETARDERS

- A. Sheet Vapor Retarder, Class A: ASTM E1745, Class A. Include manufacturer's recommended adhesive or pressure-sensitive tape.
1. Polyethylene sheet not less than 8 mils thick.
 2. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. **Barrier-Bac; Inteplast Group**
 - b. **Foxfire Enterprises, Inc.**
 - c. **ISI Building Products**
 - d. **Poly-America, L.P.**
 - e. **R&D Workshop**
 - f. **Reef Industries, Inc.**
 - g. **Stego Industries, LLC**
 - h. **Tex-Trude**
 - i. **Viaflex**
 - j. **W. R. Meadows, Inc**

2.5 CURING MATERIALS

- A. Clear, Solvent-Borne, Membrane-Forming, Curing and Sealing Compound: ASTM C1315, Type 1, Class A.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. **ChemMasters, Inc**

- b. **Concrete Sealers USA**
- c. **Dayton Superior Corporation**
- d. **Euclid Chemical Company (The); a subsidiary of RPM International, Inc.**
- e. **Kaufman Products, Inc**
- f. **Lambert Corporation**
- g. **Laticrete International, Inc.**
- h. **MAPEI Corporation**
- i. **Master Builders Solutions, brand of MBCC Group, a Sika company**
- j. **Metalcrete Industries**
- k. **Nox-Crete Products Group**
- l. **PROSOCO, Inc**
- m. **Right Pointe**
- n. **SpecChem, LLC**
- o. **TK Products Construction Coatings, a Fenix Group SPC Company**
- p. **Vexcon Chemicals Inc.**
- q. **W. R. Meadows, Inc**

- 2. Provide material that has a maximum volatile organic compound (VOC) rating of 350 g/l.

2.6 ACCESSORIES

- A. Bonding Agent: ASTM C1059/C1059M, Type II, nonredispersible, acrylic emulsion or styrene butadiene.

2.7 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
 - 1. Cement Binder: ASTM C150/C150M portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
 - 2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
 - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand, as recommended by underlayment manufacturer.
 - 4. Compressive Strength: Not less than **4100 psi** at 28 days when tested in accordance with ASTM C109/C109M.
- B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch and that can be filled in over a scarified surface to match adjacent floor elevations.
 - 1. Cement Binder: ASTM C150/C150M portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
 - 2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
 - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
 - 4. Compressive Strength: Not less than **5000 psi** at 28 days when tested in accordance with ASTM C109/C109M.

2.8 CONCRETE MIXTURE MATERIALS

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, in accordance with ACI 301.
 - 1. Use a qualified testing agency for preparing and reporting proposed mixture designs, based on laboratory trial mixtures.
- B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland or hydraulic cement in concrete assigned to Exposure Class F3 as follows:
 - 1. Fly Ash or Other Pozzolans: 20 percent by mass.
- C. Admixtures: Use admixtures in accordance with manufacturer's written instructions.
 - 1. Admixtures, General: Provide concrete admixtures that contain not more than 0.1 percent chloride ions.
 - 2. Use water-reducing admixture in all 3000 psi concrete.
 - 3. Using high-range water-reducing admixture (super-plasticizer) in concrete, as required, for placement and workability.
 - 4. Use accelerating admixture in concrete slabs placed at ambient temperatures below 50° F (10° C).
 - 5. Use air-entraining admixture in exterior exposed concrete unless otherwise indicated.
 - a. Air-Entraining Admixture ASTM C 260, certified by manufacturer to be compatible with other required admixtures.
 - b. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content of 5% with a tolerance of plus or minus 1 ½ percent.
 - 6. Use admixtures for water reduction and set accelerating or retarding in strict compliance with manufacturer's directions.

2.9 CONCRETE MIXTURE CLASS TYPES

- A. Class A: Normal-weight concrete used for foundations, footings, grade beams, tie beams and slabs-on-grade.
 - 1. Exposure Class: ACI 318 Class F0.
 - 2. Minimum Compressive Strength: 3000 psi at 28 days.
 - 3. Maximum w/cm Ratio: 0.50 (non air-entrained), 0.45 (air-entrained).
 - 4. Minimum cement factor = 489 lbs./c.y.
 - 5. Water reducing admixture is required.
 - 6. SLUMP LIMITS: Proportion and design mixes to result in concrete slump at point of placement as follows:
 - a. Ramps, slabs, and sloping surfaces: Not more than 4 inches.
 - b. Concrete Footing Shafts: Slump range of 5 to 8 inches.
 - c. Grade Beams: Slump range 3 to 5 inches.
 - d. Slabs and Pavements on Grade: Maximum slump 5 inches.
 - e. Concrete containing high-range water-reducing admixture (super-plasticizer): Not more than 8 inches after adding admixture to site-verified 2 to 3 inch slump concrete.
 - f. Other concrete: Not more than 4 inches.

- B. Class B: Structural lightweight concrete used for interior suspended slabs, steel decks and/or stair landings or steps shall be 4000 psi, 28-day compressive strength lightweight concrete. Water-cement ratio shall be as required by vendor. Water reducing admixture is required.
 - 1. Maximum Size Aggregate for steel decks, stair landings and stair pans: 1/2 inch.
- C. Class C: Concrete grout for CMU pier, bond beam, and lintel fill, If shown on Drawings, shall be 2500-psi, 28-day compressive strength conforming to ASTM C 416 standard specification. Design mixture to be 1/2, 1/2, 1 1/2 (Portland cement, sand, pea gravel) with 3/8" maximum size pea gravel.
 - 1. Slump Limit: 7 to 9 inches.
- D. All other concrete shall be Class D: 3500 psi, 28-day compressive strength normal weight. Minimum cement factor = 520 lbs./c.y. (non air-entrained).
 - 1. Slump Limit: Not more than 4 inches.
- E. Limit water-soluble, chloride-ion content in hardened concrete to 0.1 percent by weight of cementitious materials.

2.10 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete in accordance with ASTM C94/C94M and furnish delivery ticket.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions:
 - 1. Before placing concrete, verify that installation of concrete forms, accessories, reinforcement, and embedded items is complete and that required inspections have been performed.
 - 2. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Provide reasonable auxiliary services to accommodate field testing and inspections, acceptable to testing agency, including the following:
 - 1. Daily access to the Work.
 - 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 - 3. Secure space for storage, initial curing, and field curing of test samples, including source of water and continuous electrical power at Project site during site curing period for test samples.
 - 4. Security and protection for test samples and for testing and inspection equipment at Project site.

3.3 TOLERANCES

- A. Comply with ACI 117.

3.4 INSTALLATION OF EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining Work that is attached to or supported by cast-in-place concrete.
 - 1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 2. Install reglets to receive waterproofing and through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.

3.5 INSTALLATION OF VAPOR RETARDERS

- A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder in accordance with ASTM E1643 and manufacturer's written instructions.
 - 1. Install vapor retarder with longest dimension parallel with direction of concrete pour.
 - 2. Face laps away from exposed direction of concrete pour.
 - 3. Lap vapor retarder over footings and grade beams not less than 6 inches, sealing vapor retarder to concrete.
 - 4. Lap joints 6 inches and seal with manufacturer's recommended tape.
 - 5. Terminate vapor retarder at the top of floor slabs, grade beams, and pile caps, sealing entire perimeter to floor slabs, grade beams, foundation walls, or pile caps.
 - 6. Seal penetrations in accordance with vapor retarder manufacturer's instructions.
 - 7. Protect vapor retarder during placement of reinforcement and concrete.
 - a. Repair damaged areas by patching with vapor retarder material, overlapping damages area by 6 inches on all sides and sealing to vapor retarder.

3.6 INSTALLATION OF CAST-IN-PLACE CONCRETE

- A. Before placing concrete, verify that installation of formwork, reinforcement, embedded items, and vapor retarder is complete and that required inspections are completed.
 - 1. Immediately prior to concrete placement, inspect vapor retarder for damage and deficient installation, and repair defective areas.
 - 2. Provide continuous inspection of vapor retarder during concrete placement and make necessary repairs to damaged areas as Work progresses.
- B. Notify Architect and testing and inspection agencies 24 hours prior to commencement of concrete placement.
- C. Water addition in transit or at the Project site must be in accordance with ASTM C94/C94M and must not exceed the permitted amount indicated on the concrete delivery ticket.
- D. GENERAL: Comply with ACI 304.3R and as specified.
- E. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new

concrete is placed on concrete that has hardened enough to cause seams or planes of weakness.

1. If a section cannot be placed continuously, provide construction joints as indicated.
 2. Deposit concrete to avoid segregation.
 3. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
 4. Consolidate placed concrete with mechanical vibrating equipment in accordance with ACI 301
 - a. Do not use vibrators to transport concrete inside forms.
 - b. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer.
 - c. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity.
 - d. At each insertion, limit duration of vibration to time necessary to consolidate concrete, and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- F. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
1. Do not place concrete floors and slabs in a checkerboard sequence.
 2. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 3. Maintain reinforcement in position on chairs during concrete placement.
 4. Screed slab surfaces with a straightedge and strike off to correct elevations.
 5. Level concrete, cut high areas, and fill low areas.
 6. Slope surfaces uniformly to drains where required.
 7. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface.
 8. Do not further disturb slab surfaces before starting finishing operations.
- G. COLD-WEATHER PLACEMENT: Comply with provisions of ACI 306.1 and as follows:
1. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
 2. When air temperature has fallen to or is expected to fall below 40 degrees F (4 degrees C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 degrees F (10 degrees C) and not more than 80 degrees F (27 degrees C) at point of placement.
 3. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 4. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise accepted in mix designs.
- H. HOT-WEATHER PLACEMENT: When hot weather conditions exist that would impair quality and strength of concrete, place concrete complying with ACI 305.1 and as specified.
1. Cool ingredients before mixing to maintain concrete temperature at time of placement to below 90 degrees F (32 degrees C). Mixing water may be chilled or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 2. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedding in concrete.

3. Fog spray forms, reinforcing steel, and subgrade just before placing concrete. Keep subgrade moisture uniform without puddles or dry areas.
4. Use water-reducing retarding admixture when required by high temperatures, low humidity, or other adverse placing conditions, as acceptable to Architect.

3.7 INSTALLATION OF JOINTS

- A. Construct joints true to line, with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Coordinate with floor slab pattern and concrete placement sequence.
 1. Install so strength and appearance of concrete are not impaired, at locations indicated on Drawings or as approved by Architect.
 2. Place joints perpendicular to main reinforcement.
 - a. Continue reinforcement across construction joints unless otherwise indicated.
 3. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
 4. Locate joints for beams, slabs, joists, and girders at third points of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
 5. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
 6. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Control Joints in Slabs-on-Ground: Form weakened-plane control joints, sectioning concrete into areas as indicated. Construct control joints for a depth equal to at least one-fourth of concrete thickness as follows:
 1. Use saw cuts 1/8 inch wide by one-fourth of slab depth or inserts 1/4 inch wide by one-fourth of slab depth, unless otherwise indicated.
 2. Sawed Joints: Form control joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random cracks.
 3. If joint pattern is not shown, provide joints not exceeding 15 feet in either direction and locate to conform to bay spacing wherever possible (at column centerlines, at half bays, third bays).
 4. Joint fillers and sealants shall be as specified on plans.
- D. Isolation Joints in Slabs-on-Ground: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
 1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated on Drawings.
 2. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

3.8 APPLICATION OF FINISHING FLOORS AND SLABS

- A. Scratch Finish:
 1. While still plastic, texture concrete surface that has been screeded and bull-floated or darbied.

2. Use stiff brushes, brooms, or rakes to produce a profile depth of 1/4 inch in one direction.
3. Apply scratch finish to surfaces to receive concrete floor toppings and to receive mortar setting beds for bonded cementitious floor finishes.

B. Float Finish:

1. When bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operation of specific float apparatus, consolidate concrete surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats.
2. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture and complies with ACI 117 tolerances for conventional concrete.
3. Apply float finish to surfaces to receive trowel finish and to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing.

C. Trowel Finish:

1. After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel.
2. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance.
3. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
4. Do not add water to concrete surface. Use of an approved finishing aid is acceptable.
5. Do not apply troweled finish to concrete, which has a total air content greater than 3 percent.
6. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
7. Finish surfaces to the following tolerances, in accordance with ASTM E1155, for a randomly trafficked floor surface:

a. Slabs on Ground:

- 1) Specified overall values of flatness, FF 35; and of levelness, FL 25; with minimum local values of flatness, FF 24; and of levelness, FL 17.

b. Suspended Slabs:

- 1) Specified overall values of flatness, FF 35; and of levelness, FL 20; with minimum local values of flatness, FF 24; and of levelness, FL 15.

D. Trowel and Fine-Broom Finish: First apply a trowel finish to surfaces indicated on Drawings where ceramic or quarry tile is to be installed by either thickset or thinset method. While concrete is still plastic, slightly scarify surface with a fine broom perpendicular to main traffic route.

1. Coordinate required final finish with Architect before application.
2. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.

E. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and locations indicated on Drawings.

1. Immediately after float finishing, slightly roughen trafficked surface by brooming with a fiber-bristle broom perpendicular to main traffic route.
2. Coordinate required final finish with Architect before application.

3.9 APPLICATION OF FINISHING FORMED SURFACES

A. As-Cast Surface Finishes:

1. ACI 301 (ACI 301M) Surface Finish SF-1.0: As-cast concrete texture imparted by form-facing material.
 - a. Patch voids larger than 1-1/2 inches wide or 1/2 inch deep.
 - b. Remove projections larger than 1 inch.
 - c. Tie holes do not require patching.
 - d. Surface Tolerance: ACI 117, Class D.
 - e. Apply to concrete surfaces for metal lap pan deck formed surfaces and those surfaces that are buried or covered with subsequent installed surfaces.
2. ACI 301 (ACI 301M) Surface Finish SF-2.0: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams.
 - a. Patch voids larger than 3/4 inch wide or 1/2 inch deep.
 - b. Remove projections larger than 1/4 inch.
 - c. Patch tie holes.
 - d. Surface Tolerance: ACI 117, Class B.
 - e. Locations: Apply to concrete surfaces exposed to public view, to receive a rubbed finish, or to be covered with a coating or covering material applied directly to concrete.

B. Rubbed Finish: Apply the following to as-cast surface finishes where indicated on Drawings:

1. Smooth-Rubbed Finish:
 - a. Perform no later than one day after form removal.
 - b. Moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture.
 - c. If sufficient cement paste cannot be drawn from the concrete by the rubbing process, use a grout made from the same cementitious materials used in the in-place concrete.
 - d. Maintain required patterns or variances as shown on Drawings or to match field sample panels/mockups.

3.10 INSTALLATION OF MISCELLANEOUS CONCRETE ITEMS

A. Filling in:

1. Fill in holes and openings left in concrete structures after Work of other trades is in place unless otherwise indicated.
2. Mix, place, and cure concrete, as specified, to match color and texture with in-place construction exposed to view.
3. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations:

1. Coordinate sizes and locations of concrete bases with actual equipment provided.
2. Construct concrete bases 4 inches high unless otherwise indicated on Drawings, and extend base not less than 6 inches in each direction beyond the maximum dimensions of supported equipment unless otherwise indicated on Drawings.
3. Minimum Compressive Strength: 3000 psi at 28 days.
4. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.
5. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete substrate.
6. Prior to pouring concrete, place and secure anchorage devices.
 - a. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - b. Cast anchor-bolt insert into bases.
 - c. Install anchor bolts to elevations required for proper attachment to supported equipment.

3.11 APPLICATION OF CONCRETE CURING

- A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
 1. Comply with ACI 301 for cold weather protection during curing.
 2. Comply with ACI 301 and ACI 305.1 for hot-weather protection during curing.
 3. Maintain moisture loss no more than 0.2 lb/sq. ft. x h, calculated in accordance with ACI 305R, before and during finishing operations.
- B. Curing Formed Surfaces: Comply with ACI 308.1 as follows:
 1. Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces.
 2. Cure concrete containing color pigments in accordance with color pigment manufacturer's instructions.
 3. If forms remain during curing period, moist cure after loosening forms.
 4. If removing forms before end of curing period, continue curing for remainder of curing period as follows:
 - a. Continuous Fogging: Maintain standing water on concrete surface until final setting of concrete.
 - b. Continuous Sprinkling: Maintain concrete surface continuously wet.
 - c. Absorptive Cover: Pre-dampen absorptive material before application; apply additional water to absorptive material to maintain concrete surface continuously wet.
 - d. Water-Retention Sheeting Materials: Cover exposed concrete surfaces with sheeting material, taping, or lapping seams.
 - e. Membrane-Forming Curing Compound: Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.
 - 1) Recoat areas subject to heavy rainfall within three hours after initial application.
 - 2) Maintain continuity of coating and repair damage during curing period.
- C. Curing Unformed Surfaces: Comply with ACI 308.1 as follows:
 1. Begin curing after finishing concrete.
 2. Interior Concrete Floors:

- a. Floors to Receive Floor Coverings Specified in Other Sections: Contractor has option of the following:
 - 1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
 - a) Lap edges and ends of absorptive cover not less than 12 inches.
 - b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.
 - 2) Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive.
 - a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
 - b) Cure for not less than seven days.
 - 3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following not in cold weather:
 - a) Water.
 - b) Continuous water-fog spray.
- b. Floors to Receive Penetrating Liquid Floor Treatments: Contractor has option of the following:
 - 1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
 - a) Lap edges and ends of absorptive cover not less than 12 inches.
 - b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.
 - 2) Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive.
 - a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
 - b) Cure for not less than seven days.
 - 3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:
 - a) Water.
 - b) Continuous water-fog spray.
- c. Floors To Receive Curing Compound:

- 1) Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.
- 2) Recoat areas subjected to heavy rainfall within three hours after initial application.
- 3) Maintain continuity of coating, and repair damage during curing period.
- 4) Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer.

d. Floors To Receive Curing and Sealing Compound:

- 1) Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller in accordance with manufacturer's written instructions.
- 2) Recoat areas subjected to heavy rainfall within three hours after initial application.
- 3) Repeat process 24 hours later, and apply a second coat. Maintain continuity of coating, and repair damage during curing period.

3.12 INSTALLATION OF CONCRETE SURFACE REPAIRS

A. Defective Concrete:

1. Repair and patch defective areas when approved by Architect.
2. Remove and replace concrete that cannot be repaired and patched to meet specification requirements.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks in excess of 0.01 inch spalls, air bubbles exceeding surface finish limits, honeycombs, rock pockets, fins and other projections on the surface exceeding surface finish limits, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete.
 - a. Limit cut depth to 3/4 inch.
 - b. Make edges of cuts perpendicular to concrete surface.
 - c. Clean, dampen with water, and brush-coat holes and voids with bonding agent.
 - d. Fill and compact with patching mortar before bonding agent has dried.
 - e. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement, so that, when dry, patching mortar matches surrounding color.
 - a. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching.
 - b. Compact mortar in place and match surrounding surface.
3. Repair defects on concealed formed surfaces that will affect concrete's durability and structural performance, as determined by Architect.

D. Repairing Unformed Surfaces:

1. Test unformed surfaces, such as floors and slabs, for finish, and verify surface tolerances specified for each surface.
 - a. Correct low and high areas.
 - b. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
 2. Repair finished surfaces containing surface defects, including spalls, popouts, honeycombs, rock pockets, crazing, and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width.
 3. After concrete has cured at least 14 days, correct high areas by grinding.
 4. Correct localized low areas during, or immediately after, completing surface-finishing operations by adding patching mortar.
 - a. Finish repaired areas to blend into adjacent concrete.
 5. Correct other low areas scheduled to receive floor coverings with a repair underlayment.
 - a. Prepare, mix, and apply repair underlayment and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
 - b. Feather edges to match adjacent floor elevations.
 6. Correct other low areas scheduled to remain exposed with repair topping.
 - a. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations.
 - b. Prepare, mix, and apply repair topping and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
 7. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete.
 - a. Remove defective areas with clean, square cuts, and expose steel reinforcement with at least a 3/4-inch clearance all around.
 - b. Dampen concrete surfaces in contact with patching concrete and apply bonding agent.
 - c. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate.
 - d. Place, compact, and finish to blend with adjacent finished concrete.
 - e. Cure in same manner as adjacent concrete.
 8. Repair random cracks and single holes 1 inch or less in diameter with patching mortar.
 - a. Groove top of cracks and cut out holes to sound concrete, and clean off dust, dirt, and loose particles.
 - b. Dampen cleaned concrete surfaces and apply bonding agent.
 - c. Place patching mortar before bonding agent has dried.
 - d. Compact patching mortar and finish to match adjacent concrete.
 - e. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

- F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.13 FIELD QUALITY CONTROL

- A. Testing Agency: Owner shall engage and pay for the services of a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
 - 1. Testing agency to be responsible for providing curing facility for initial curing of strength test specimens on-site and verifying that test specimens are cured in accordance with standard curing requirements in ASTM C31/C31M.
 - 2. Testing agency to immediately report to Architect, Owner, Contractor, and concrete manufacturer any failure of Work to comply with Contract Documents.
 - 3. Testing agency to report results of tests and inspections, in writing, to Owner, Architect, Contractor, and concrete manufacturer within 48 hours of inspections and tests.
 - a. Test reports to include reporting requirements of ASTM C31/C31M, ASTM C39/C39M, and ACI 301, including the following as applicable to each test and inspection:
 - 1) Project name.
 - 2) Name of testing agency.
 - 3) Names and certification numbers of field and laboratory technicians performing inspections and testing.
 - 4) Name of concrete manufacturer.
 - 5) Date and time of inspection, sampling, and field testing.
 - 6) Date and time of concrete placement.
 - 7) Location in Work of concrete represented by samples.
 - 8) Date and time sample was obtained.
 - 9) Truck and batch ticket numbers.
 - 10) Design compressive strength at 28 days.
 - 11) Concrete mixture designation, proportions, and materials.
 - 12) Field test results of fresh concrete, including slump or slump flow, air content, temperature and density.
 - 13) Information on storage and curing of samples at the Project site, including curing method and maximum and minimum temperatures during initial curing period.
 - 14) Type of fracture and compressive break strengths at seven days and 28 days.
 - 4. Provide a space and source of power or other resources for curing and access to test specimens by the testing agency.
- B. Delivery Tickets: comply with ASTM C94/C94M.
- C. Concrete Tests: Testing of composite samples of fresh concrete obtained in accordance with ASTM C 172/C 172M to be performed in accordance with the following requirements:
 - 1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 150 cu. yd. or fraction thereof.
 - a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing is to be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C143/C143M:
 - a. One test at point of delivery for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 - b. Perform additional tests as needed.
3. Air Content: ASTM C231/C231M pressure method, for normal-weight concrete; ASTM C173/C173M volumetric method, for structural lightweight concrete.
 - a. One test for each composite sample when strength test specimens are cast, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C1064/C1064M:
 - a. One test hourly when air temperature is 40 deg F and below or 80 deg F and above, and one test for each composite sample when strength test specimens are cast.
5. Concrete Density: ASTM C138/C138M:
 - a. One test for each composite sample when strength test specimens are cast.
6. Unit Weight: ASTM C138/C138M density of fresh structural lightweight concrete.
 - a. One test for each composite sample, but not less than one test for each day's pour of each concrete mixture. The fresh density should be consistent with that associated with the equilibrium density within a tolerance of plus or minus 4 lb/ft.3.
7. Compression Test Specimens: ASTM C31/C31M:
 - a. Cast and standard cure one set of four 6 inches by 12-inches cylindrical specimens for each composite sample, unless otherwise directed.
 - b. Mold and store cylinders for laboratory-cured test specimens except when field-cured test specimens are required.
8. Compressive-Strength Tests: ASTM C39/C39M.
 - a. Test one standard cured specimen at seven days and one set of two specimens at 28 days, and one specimen retained in reserve for later testing if required.
 - b. A compressive-strength test to be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
9. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor to evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
10. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests of standard cured cylinders equals or exceeds specified compressive strength, and no compressive-strength test value falls below specified compressive strength by more than 500 psi if specified compressive strength is 5000 psi, or no compressive strength test value is less than 10 percent of specified compressive strength if specified compressive strength is greater than 5000 psi.
11. Test results will be reported in writing to Architect, Owner, ready-mix producer, and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the Project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials,

- compressive breaking strength, and type of break for both 7-day tests and 28-day tests.
12. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
 13. Additional Tests:
 - a. Testing and inspecting agency to make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.
 - b. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42/C42M or by other methods as directed by Architect.
 - 1) Acceptance criteria for concrete strength to be in accordance with ACI 301, Section 1.7.6.3.
 14. Additional testing and inspecting, at Owner's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
 15. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

3.14 PROTECTION

A. Protect concrete surfaces as follows:

1. Protect from petroleum stains.
2. Diaper hydraulic equipment used over concrete surfaces.
3. Prohibit vehicles from interior concrete slabs.
4. Prohibit use of pipe-cutting machinery over concrete surfaces.
5. Prohibit placement of steel items on concrete surfaces.
6. Prohibit use of acids or acidic detergents over concrete surfaces.
7. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.

END OF SECTION 033000

DIVISION 4 - MASORY
SECTION 042000 - UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Brick.
2. Mortar and grout materials.
3. Ties and anchors.
4. Embedded flashing.
5. Accessories.
6. Mortar and grout mixes.

B. Related Requirements:

1. Section 072100 "Thermal Insulation" for wall insulation.
2. Section 076200 "Sheet Metal Flashing and Trim" for sheet metal flashing.

1.2 ALLOWANCES

A. See Section 012100 "Allowances" for description of allowances affecting items specified in this Section.

B. Furnish the following under the allowances indicated as specified in Division 1 Section "Allowances."

1. Face brick under the Face Brick Allowance.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples for Initial Selection:

1. Clay face brick, in the form of straps of five or more bricks.
2. Colored mortar.

C. Samples for Verification: For each type and color of the following:

1. Clay face brick, in the form of straps of five or more bricks.
2. Pigmented and colored-aggregate mortar. Make Samples using same sand and mortar ingredients to be used on Project.

1.4 INFORMATIONAL SUBMITTALS

A. Material Certificates: For each type of the following:

1. Masonry units.
 - a. Include data on material properties.
 - b. For brick, include size-variation data verifying that actual range of sizes falls within specified tolerances.
 2. Cementitious materials. Include name of manufacturer, brand name, and type.
 3. Mortar admixtures.
 4. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
 5. Grout mixes. Include description of type and proportions of ingredients.
 6. Anchors, ties, and metal accessories.
- B. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.5 MOCKUPS

- A. Sample Panel Mockups: Build sample panels to verify selections made under Sample submittals and to demonstrate aesthetic effects. Comply with requirements in Section 014000 "Quality Requirements" for mockups.
1. Build sample panels for typical exterior wall in sizes approximately 72 inches long by 48 inches high by full thickness.
 2. Build sample panels facing south.
 3. Where masonry is to match existing, build panels adjacent and parallel to existing surface.
 4. Clean exposed faces of panels with masonry cleaner indicated.
 5. Protect approved sample panels from the elements with weather-resistant membrane.
 6. Approval of sample panels is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; aesthetic qualities of workmanship; and other material and construction qualities specifically approved by Architect in writing.
 - a. Approval of sample panels does not constitute approval of deviations from the Contract Documents contained in sample panels unless Architect specifically approves such deviations in writing.
 7. Build mockups for typical exterior wall in sizes approximately 72 inches long by 48 inches high by full thickness, including face and backup wythes and accessories.
 - a. Include a sealant-filled joint at least 16 inches long in exterior wall mockup.
 - b. Include lower corner of window opening, at upper corner of exterior wall mockup. Make opening approximately 12 inches wide by 16 inches high.
 - c. Include through-wall flashing installed for a 24-inch length in corner of exterior wall mockup approximately 16 inches down from top of mockup, with a 12-inch length of flashing left exposed to view (omit masonry above half of flashing).
 - d. Include studs, sheathing, water-resistive barrier, sheathing joint-and-penetration treatment, veneer anchors, flashing, cavity drainage material, and weep holes in exterior masonry-veneer wall mockup.
 8. Where masonry is to match existing, erect mockups adjacent and parallel to existing surface.
 9. Clean exposed faces of mockups with masonry cleaner as indicated.
 10. Protect accepted mockups from the elements with weather-resistant membrane.
 11. Approval of mockups does not constitute approval of deviations from the Contract

Documents contained in mockups unless Architect specifically approves such deviations by Change Order.

12. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.7 FIELD CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
 - 1. Extend cover a minimum of 24 inches down both sides of walls and hold cover securely in place.
 - 2. Where one wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover in place.
- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
 - 1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
 - 2. Protect sills, ledges, and projections from mortar droppings.
 - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
 - 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in

TMS 602.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.
- E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Obtain exposed masonry units, cementitious mortar components and mortar aggregate from single source or manufacturer.
- B. For exposed masonry units and cementitious mortar components, obtain each color and grade from single source with resources to provide materials of consistent quality in appearance and physical properties.

2.2 UNIT MASONRY, GENERAL

- A. Masonry Standard: Comply with TMS 602, except as modified by requirements in the Contract Documents.
- B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work.
- C. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated.
 1. Where fire-resistance-rated construction is indicated, units are listed by UL or a qualified testing agency acceptable to authorities having jurisdiction.

2.3 BRICK

- A. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units:
 1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
 2. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing where shapes produced by sawing would result in sawed surfaces being exposed to view.
- B. Clay Face Brick: Facing brick complying with ASTM C216 or hollow brick complying with ASTM C652, Class H40V (void areas between 25 and 40 percent of gross cross-sectional area), Grade MW or Grade SW, Type FBS or Type HBS.

1. Initial Rate of Absorption: Less than 30 g/30 sq. in. per minute when tested in accordance with ASTM C67/C67M.
2. Efflorescence: Provide brick that has been tested in accordance with ASTM C67/C67M and is rated "not effloresced."
3. Size (Actual Dimensions): 3-5/8 inches wide by 2-1/4 inches high by 7-5/8 inches long.
4. Application: Use where brick is exposed unless otherwise indicated.
5. Where shown to "match existing," provide face brick matching color range, texture, and size of existing adjacent brickwork.
6. Color and Texture: As selected by Architect.

C. Building (Common) Brick: ASTM C62, Grade MW or Grade SW

1. Size (Actual Dimensions): 3-5/8 inches wide by 2-1/4 inches high by 7-5/8 inches long.
2. Application: Use where brick is indicated for concealed locations. Face brick complying with requirements for grade, compressive strength, and size indicated for building brick may be substituted for building brick.

2.4 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C150/C150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

1. Alkali content will not be more than 0.1 percent when tested in accordance with ASTM C114.

B. Hydrated Lime: ASTM C207, Type S.

C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

D. Mortar Cement: ASTM C1329/C1329M.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Lafarge North America Inc.

E. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C979/C979M. Use only pigments with a record of satisfactory performance in masonry mortar.

F. Colored Cement Products: Packaged blend made from portland cement and hydrated lime or masonry cement and mortar pigments, all complying with specified requirements, and containing no other ingredients.

1. Colored Masonry Cement:

- a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- 1) Argos USA LLC
 - 2) Heidelberg Materials

3) Holcim (US) Inc

2. Formulate blend as required to produce color indicated or, if not indicated, as selected from manufacturer's standard colors.
3. Pigments do not exceed 10 percent of portland cement by weight.
4. Pigments do not exceed 5 percent of masonry cement or mortar cement by weight.

G. Preblended Dry Mortar Mix: Packaged blend made from portland cement and hydrated lime, masonry cement or mortar cement, sand, mortar pigments, water repellents, and admixtures and complying with ASTM C1714/C1714M.

1. Preblended Dry Portland Cement Mortar Mix:

- a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- 1) Amerimix is a trademark of Bonsal American, an Oldcastle company
- 2) Sakrete; CRH Americas, Oldcastle APG
- 3) SPEC MIX, LLC

H. Aggregate for Mortar: ASTM C144.

1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
2. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
3. White-Mortar Aggregates: Natural white sand or crushed white stone.
4. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.

I. Aggregate for Grout: ASTM C404.

J. Water: Potable.

2.5 TIES AND ANCHORS

A. General: Ties and anchors extend at least 1-1/2 inches into veneer but with at least a 5/8-inch cover on outside face.

B. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:

1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A1064/A1064M, with ASTM A153/A153M, Class B-2 coating.
2. Steel Sheet, Galvanized after Fabrication: ASTM A1008/A1008M, Commercial Steel, with ASTM A153/A153M, Class B coating.
3. Steel Plates, Shapes, and Bars: ASTM A36/A36M.

C. Individual Wire Ties: Rectangular units with closed ends and not less than 4 inches wide.

1. Z-shaped ties with ends bent 90 degrees to provide hooks not less than 2 inches long for masonry constructed from solid units.
2. Where wythes do not align, or are of different materials, use adjustable ties with pintle-and-eye connections having a maximum adjustment of 1-1/4 inches.

3. Wire: Fabricate from 3/16-inch- diameter, hot-dip galvanized steel wire.
- D. Adjustable Anchors for Connecting to Structural Steel Framing: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
 1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch- diameter, hot-dip galvanized steel wire.
 2. Tie Section: Triangular-shaped wire tie made from 0.187-inch- diameter, hot-dip galvanized steel wire.
- E. Adjustable Masonry-Veneer Anchors:
 1. General: Provide anchors that allow vertical adjustment but resist a 100 lbf load in both tension and compression perpendicular to plane of wall without deforming or developing play in excess of 1/16 inch.
 2. Fabricate sheet metal anchor sections and other sheet metal parts from 0.0785-inch-thick steel sheet, galvanized after fabrication.
 3. Fabricate wire ties from 0.187-inch- diameter, hot-dip galvanized-steel wire unless otherwise indicated.
 4. Masonry-Veneer Anchors; Slotted Plate: Sheet metal anchor section, with screw holes at top and bottom; and raised rib-stiffened strap, stamped into center to provide a slot between strap and base for wire tie.
 - a. Basis-of-Design Product: Subject to compliance with requirements, provide Hohmann & Barnard DW-10HS or Wire-Bond 1004 Type III with 1100 Series Triangular Ties or comparable product by one of the following:
 - 1) Heckmann Building Products, Inc.
 - 2) Hohmann & Barnard, Inc.
 - 3) Wire-Bond
 5. Wood Screws for Wood Studs: Type designed to fasten masonry veneer anchors to wood stud backing. Phillips Head, #9 diameter by 1-5/8" (41mm) minimum length, with corrosion resistant coating.

2.6 EMBEDDED FLASHING

- A. Metal Flashing:
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Cheney Flashing Company
 - b. Hohmann & Barnard, Inc
 - c. Keystone Flashing Company, Inc
 - d. Wire-Bond
 2. General: Provide metal flashing complying with SMACNA's "Architectural Sheet Metal Manual" and as follows:
 - a. Stainless Steel: ASTM A240/A240M or ASTM A666, Type 304, 0.016 inch thick.
 - b. Fabricate continuous flashings in sections 96 inches long minimum, but not exceeding 12 ft.. Provide splice plates at joints of formed, smooth metal flashing.

- c. Fabricate through-wall flashing with drip edge where indicated. Fabricate by extending flashing 1/2 inch out from wall, with outer edge bent down 30 degrees.
 - d. Fabricate metal drip edges from stainless steel. Extend at least 3 inches into wall and 1/2 inch out from wall, with outer edge bent down 30 degrees.
 - e. Fabricate metal expansion-joint strips from stainless steel to shapes indicated.
 - f. Solder or seal metal items at corners.
- B. Flexible Flashing: Use the following unless otherwise indicated:
 - 1. Copper-Fabric Flashing: 3 oz./sq. ft. copper sheet bonded between two layers of glass-fiber cloth.
 - a. Basis-of-Design Product: Subject to compliance with requirements, provide Hohmann & Barnard Copper NA or York Multi-Flash 500 Copper Fabric Flashing or comparable product by one of the following:
 - 1) Hohmann & Barnard, Inc
 - 2) York Manufacturing, Inc
- C. Solder and Sealants for Sheet Metal Flashings: As specified in Section 076200 "Sheet Metal Flashing and Trim."
 - 1. Solder for Stainless Steel: ASTM B32, Grade Sn60, with acid flux of type recommended by stainless steel sheet manufacturer.
 - 2. Solder for Copper: ASTM B32, Grade Sn50 with maximum lead content of 0.2 percent.
 - 3. Elastomeric Sealant: ASTM C920, chemically curing urethane sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and remain watertight.
- D. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.
- E. Termination Bars for Flexible Flashing: Stainless steel bars 1/8 inch by 1 inch.
- F. Termination Bars for Flexible Flashing, Flanged: Stainless steel sheet 0.019 inch by 1-1/2 inches flange at top.

2.7 ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene.
- B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D2000, Designation M2AA-805 or PVC, complying with ASTM D2287, Type PVC-65406 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
- C. Bond-Breaker Strips: Asphalt-saturated felt complying with ASTM D226/D226M, Type I (No. 15 asphalt felt).
- D. Weep/Cavity Vents: Use one of the following unless otherwise indicated:
 - 1. Rectangular Plastic Weep/Vent Tubing: Clear butyrate, 3/8 by 1-1/2 by 3-1/2 inches long.
 - 2. Cellular Plastic Weep/Vent: One-piece, flexible extrusion made from UV-resistant

polypropylene copolymer, full height and width of head joint and depth 1/8 inch less than depth of outer wythe, in color selected from manufacturer's standard.

- a. Basis-of-Design Product: Subject to compliance with requirements, provide Hohmann & Barnard 342S or comparable product by one of the following:

- 1) Heckmann Building Products, Inc.
- 2) Wire-Bond
- 3) Mortar Net Solutions

- E. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.

- 1. Mortar Deflector: Strips, full depth of cavity and 10 inches high, with dovetail-shaped notches that prevent clogging with mortar droppings.

- a. Basis-of-Design Product: Subject to compliance with requirements, provide Mortar Net Solutions; MortarNet or comparable product by one of the following:

- 1) Advanced Building Products Inc.
- 2) Hohmann & Barnard, Inc
- 3) Wire-Bond

- F. Proprietary Acidic Masonry Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

- 1. Basis-of-Design Product: Subject to compliance with requirements, provide PROSOCO Sure Klean 600 or comparable product by one of the following:

- a. Diedrich Technologies, Inc.; a Hohmann & Barnard company
- b. EaCo Chem, Inc.
- c. PROSOCO, Inc

2.8 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.

- 1. Do not use calcium chloride in mortar or grout.
- 2. Use portland cement-lime mortar unless otherwise indicated.
- 3. For exterior masonry, use portland cement-lime mortar.
- 4. For reinforced masonry, use portland cement-lime mortar.
- 5. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.

- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

- C. Mortar for Unit Masonry: Comply with ASTM C270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated or needed to provide required compressive strength of masonry.

1. For masonry below grade or in contact with earth, use Type M.
 2. For reinforced masonry, use Type S.
 3. For mortar parge coats, use Type N.
 4. For exterior, above-grade, load-bearing, nonload-bearing walls, and parapet walls; for interior load-bearing walls; for interior nonload-bearing partitions; and for other applications where another type is not indicated, use Type N.
 5. For interior nonload-bearing partitions, Type O may be used instead of Type N.
- D. Pigmented Mortar: Use colored cement product.
1. Pigments do not exceed 10 percent of portland cement by weight.
 2. Pigments do not exceed 5 percent of masonry cement or mortar cement by weight.
 3. Mix to match Architect's sample.
 4. Application: Use pigmented mortar for exposed mortar joints with the following units:
<Insert masonry unit types>.
- E. Grout for Unit Masonry: Comply with ASTM C476.
1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602 for dimensions of grout spaces and pour height.
 2. Proportion grout in accordance with ASTM C476, Table 1 or paragraph 4.2.1.2 for specified 28-day compressive strength indicated, but not less than 2000 psi.
 3. Provide grout with a slump of 8 to 11 inches as measured in accordance with ASTM C143/C143M.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
 2. Verify that foundations are within tolerances specified.
 3. Verify that reinforcing dowels are properly placed.
 4. Verify that substrates are free of substances that impair mortar bond.
- B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.
- B. Build chases and recesses to accommodate items specified in this and other Sections.
- C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.

- D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.
- F. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.
- G. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested in accordance with ASTM C67/C67M. Allow units to absorb water so they are damp but not wet at time of laying.
- H. Do not wet concrete masonry units.

3.3 TOLERANCES

A. Dimensions and Locations of Elements:

- 1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch or minus 1/4 inch.
- 2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch.
- 3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.

B. Lines and Levels:

- 1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 ft., or 1/2-inch maximum.
- 2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 ft., 1/4 inch in 20 ft., or 1/2-inch maximum.
- 3. For vertical lines and surfaces, do not vary from plumb by more than 1/4 inch in 10 ft., 3/8 inch in 20 ft., or 1/2-inch maximum.
- 4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 ft., 1/4 inch in 20 ft., or 1/2-inch maximum.
- 5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 ft., 3/8 inch in 20 ft., or 1/2-inch maximum.
- 6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 ft., or 1/2-inch maximum.
- 7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch except due to warpage of masonry units within tolerances specified for warpage of units.

C. Joints:

- 1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
- 2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
- 3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
- 4. For exposed head joints, do not vary from thickness indicated by more than plus or minus

- 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.
5. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch from one masonry unit to the next.

3.4 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.
- C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 4 inches. Bond and interlock each course of each wythe at corners. Do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.
- D. Stopping and Resuming Work: Stop work by stepping back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.
- E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- F. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
- G. Build nonload-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.
1. Install compressible filler in joint between top of partition and underside of structure above.
 2. Fasten partition top anchors to structure above and build into top of partition. Grout cells of CMUs solidly around plastic tubes of anchors and push tubes down into grout to provide 1/2-inch clearance between end of anchor rod and end of tube. Space anchors **[48 inches]** o.c. unless otherwise indicated.
 3. Wedge nonload-bearing partitions against structure above with small pieces of tile, slate, or metal. Fill joint with mortar after dead-load deflection of structure above approaches final position.
 4. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Section 078443 "Joint Firestopping."

3.5 MORTAR BEDDING AND JOINTING

- A. Lay CMUs as follows:
1. Bed face shells in mortar and make head joints of depth equal to bed joints.
 2. Bed webs in mortar in all courses of piers, columns, and pilasters.
 3. Bed webs in mortar in grouted masonry, including starting course on footings.
 4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.

5. Fully bed units and fill cells with mortar at anchors and ties as needed to fully embed anchors and ties in mortar.
- B. Lay solid masonry units and hollow brick with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
- D. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.
- E. Cut joints flush where indicated to receive waterproofing, cavity wall insulation, or air barriers unless otherwise indicated.

3.6 ANCHORED MASONRY VENEERS

- A. Anchor masonry veneers to wall framing and masonry backup with masonry-veneer anchors to comply with the following requirements:
 1. Fasten screw-attached anchors through sheathing to wall framing and to masonry backup with metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener.
 2. Embed tie sections in masonry joints.
 3. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
 4. Space anchors as indicated, but not more than 16 inches o.c. vertically and 16 inches o.c. horizontally, with not less than one anchor for each 2 sq. ft. of wall area. Install additional anchors within 8 inches of openings and at intervals, not exceeding 8 inches, around perimeter, and at 8 inches
- B. Provide not less than 1 inch of airspace between back of masonry veneer and face of sheathing or insulation.
 1. Keep airspace clean of mortar droppings and other materials during construction. Bevel beds away from airspace, to minimize mortar protrusions into airspace. Do not attempt to trowel or remove mortar fins protruding into airspace.

3.7 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

- A. Anchor masonry to structural steel and concrete, where masonry abuts or faces structural steel or concrete, to comply with the following:
 1. Provide an open space not less than 1/2 inch wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
 2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
 3. Space anchors as indicated, but not more than 16 inches o.c. vertically and 16 inches o.c. horizontally.

3.8 CONTROL AND EXPANSION JOINTS

- A. General: Install control- and expansion-joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.
- B. Form expansion joints in brick as follows:
 - 1. Build in compressible joint fillers where indicated.
 - 2. Form open joint full depth of brick wythe and of width indicated, but not less than 3/8 inch for installation of sealant and backer rod specified in Section 079200 "Joint Sealants."
- C. Provide horizontal, pressure-relieving joints by either leaving an airspace or inserting a compressible filler of width required for installing sealant and backer rod specified in Section 079200 "Joint Sealants," but not less than 3/8 inch.
 - 1. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry.
- D. In addition to joint locations shown on the drawings, provide vertical expansion joints in brick masonry and control joints in concrete unit masonry at the following conditions and locations for both interior and exterior walls:
 - 1. At abrupt changes in wall height, thickness, or type.
 - 2. At inside corners of wall offsets.
 - 3. Within 13 feet of external corners.
 - 4. At wall intersections.
 - 5. At structural columns and at wall pilasters.
 - 6. At both sides of all masonry openings. Coat bearing ends of steel lintels with mastic. Provide compressible foam fillers at ends of lintels and fill horizontal joint in front of lintel bearing with sealant.
 - 7. Between foundation-supported masonry and frame-supported masonry.
 - 8. At 13'-0" maximum o.c. in rowlocks and solid masonry parapets.
 - 9. At 28'-0" maximum o.c. in C.M.U.s.
 - 10. At 26'-0" maximum o.c. at all other areas.

3.9 FLASHING, WEEP HOLES, AND CAVITY VENTS

- A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.
- B. Install flashing as follows unless otherwise indicated:
 - 1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
 - 2. At multiwythe masonry walls, including cavity walls, extend flashing through outer wythe, turned up a minimum of 4 inches, and through inner wythe to within 1/2 inch of the interior face of wall in exposed masonry.
 - 3. At multiwythe masonry walls, including cavity walls, extend flashing through outer wythe, turned up a minimum of 4 inches, and 1-1/2 inches into the inner wythe.
 - 4. At masonry-veneer walls, extend flashing through veneer, across airspace behind veneer, and up face of sheathing at least 8 inches; with upper edge tucked under water-resistive barrier, lapping at least 4 inches.

5. At lintels and shelf angles, extend flashing 6 inches minimum at each end. At heads and sills, extend flashing 6 inches minimum and turn ends up not less than 2 inches to form end dams.
 6. Interlock end joints of sawtooth sheet metal flashing by overlapping ribs not less than 1-1/2 inches or as recommended by flashing manufacturer, and seal lap with elastomeric sealant complying with requirements in Section 079200 "Joint Sealants" for application indicated.
 7. Install metal drip edges with sawtooth sheet metal flashing by interlocking hemmed edges to form hooked seam. Seal seam with elastomeric sealant complying with requirements in Section 079200 "Joint Sealants" for application indicated.
 8. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall and adhere flexible flashing to top of metal drip edge.
 9. Install metal flashing termination beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall and adhere flexible flashing to top of metal flashing termination.
 10. Cut flexible flashing off flush with face of wall after masonry wall construction is completed.
- C. Install reglets and nailers for flashing and other related construction where they are indicated to be built into masonry.
- D. Install weep holes in exterior wythes and veneers in head joints of first course of masonry immediately above embedded flashing.
1. Use specified weep/cavity vent products to form weep holes.
 2. Space weep holes formed from plastic tubing 16 inches o.c.
 3. Cover cavity side of weep holes with plastic insect screening at cavities insulated with loose-fill insulation.

3.10 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
 3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
 4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by

- rinsing surfaces thoroughly with clear water.
- 5. Clean masonry with a proprietary acidic masonry cleaner applied according to manufacturer's written instructions.

3.11 MASONRY WASTE DISPOSAL

- A. Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

END OF SECTION 042000

DIVISION 5 - METALS
SECTION 051200 - STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

1. Structural-steel materials.
2. Shrinkage-resistant grout.
3. Shear stud connectors.

B. Related Requirements:

1. Section 055000 "Metal Fabrications" for miscellaneous steel fabrications and other steel items not defined as structural steel.
2. Section 099113 "Exterior Painting" and Section 099123 "Interior Painting" for painting requirements.

1.2 DEFINITIONS

- A. Structural Steel: Elements of the structural frame indicated on Drawings and as described in ANSI/AISC 303.

1.3 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

1.4 ACTION SUBMITTALS

A. Product Data:

1. Structural-steel materials.
2. High-strength, bolt-nut-washer assemblies.
3. Shear stud connectors.
4. Shop primer.
5. Shrinkage-resistant grout.

B. Shop Drawings: Show fabrication of structural-steel components.

1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
2. Include embedment Drawings.
3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed

- and supplemental fillet welds where backing bars are to remain.
- 4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical, high-strength bolted connections.
- 5. Identify members not to be shop primed.
- C. Welding Procedure Specifications (WPSs) and Procedure Qualification Records (PQRs): Provide in accordance with AWS D1.1/D1.1M for each welded joint whether prequalified or qualified by testing, including the following:
 - 1. Power source (constant current or constant voltage).

1.5 INFORMATIONAL SUBMITTALS

- A. Welding certificates.

1.6 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel in accordance with AWS D1.1/D1.1M.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.
 - 1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.
- B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.
 - 1. Clean and relubricate bolts and nuts that become dry or rusty before use.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Comply with applicable provisions of the following specifications and documents:
 - 1. ANSI/AISC 303.
 - 2. ANSI/AISC 360.
 - 3. RCSC's "Specification for Structural Joints Using High-Strength Bolts."
- B. Connection Design Information:
 - 1. Option 2: Fabricator's experienced steel detailer selects or completes connections in accordance with ANSI/AISC 303.
 - a. Select and complete connections using schematic details indicated and ANSI/AISC 360.

- C. Construction: Braced frame.

2.2 STRUCTURAL-STEEL MATERIALS

- A. W-Shapes: ASTM A992/A992M.
 - 1. Grade 50
- B. Channels, Angles, M-Shapes: ASTM A36/A36M.
- C. Channels, Angles, S-Shapes: ASTM A36/A36M.
- D. Plate and Bar: ASTM A36/A36M.
- E. Cold-Formed Hollow Structural Sections: ASTM A500/A500M, Grade B structural tubing.
- F. Steel Pipe: ASTM A53/A53M, Type S, Grade B.
 - 1. Weight Class: Standard.
 - 2. Finish: Black except where indicated to be galvanized.
- G. Steel Castings: ASTM A216/A216M, Grade WCB, with supplementary requirement S11.
- H. Welding Electrodes: Comply with AWS requirements.

2.3 BOLTS AND CONNECTORS

- A. High-Strength A325 Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325, Type 1, heavy-hex steel structural bolts; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers; all with plain finish.
 - 1. Direct-Tension Indicators: ASTM F959/F959M, Type 325-1, compressible-washer type with plain finish.
 - a. Use at Contractor's option.
- B. Anchor Bolts: Anchor bolts shall be ASTM F1554-Gr. 36.
- C. Shear Stud Connectors: ASTM A108, AISI C-1015 through C-1020, headed-stud type, cold-finished carbon steel; AWS D1.1/D1.1M, Type B.

2.4 PRIMER

- A. Steel Primer:
 - 1. Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer complying with MPI#79 and compatible with topcoat.
- B. Galvanized-Steel Primer: MPI#26.
 - 1. Etching Cleaner: MPI#25, for galvanized steel.
 - 2. Galvanizing Repair Paint: MPI#18, MPI#19, or SSPC-Paint 20.

2.5 SHRINKAGE-RESISTANT GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C1107/C1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.6 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate in accordance with ANSI/AISC 303 and to ANSI/AISC 360.
 - 1. Camber structural-steel members where indicated.
 - 2. Fabricate beams with rolling camber up.
 - 3. Mark and match-mark materials for field assembly.
 - 4. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.
- B. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.
- C. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.
- D. Shear Stud Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Weld using automatic end welding of headed-stud shear connectors in accordance with AWS D1.1/D1.1M and manufacturer's written instructions.
- E. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel members.
 - 1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
 - 2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
 - 3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.7 SHOP CONNECTIONS

- A. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

2.8 SHOP PRIMING

- A. Shop prime steel surfaces, except the following:
 - 1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
 - 2. Surfaces to be field welded.
 - 3. Surfaces of high-strength bolted, slip-critical connections.
- B. Surface Preparation of Steel: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces in accordance with the following specifications and standards:

1. SSPC-SP 3.
- C. Surface Preparation of Galvanized Steel: Prepare galvanized-steel surfaces for shop priming by thoroughly cleaning steel of grease, dirt, oil, flux, and other foreign matter, and treating with etching cleaner .
- D. Priming: Immediately after surface preparation, apply primer in accordance with manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
 2. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify, with certified steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated on Drawings.

3.3 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and in accordance with ANSI/AISC 303 and ANSI/AISC 360.
- B. Baseplates, Bearing Plates, and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.
 1. Set plates for structural members on wedges, shims, or setting nuts as required.
 2. Weld plate washers to top of baseplate.
 3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
 4. Promptly pack shrinkage-resistant grout solidly between bearing surfaces and plates, so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for grouting.
- C. Maintain erection tolerances of structural steel within ANSI/AISC 303.

- D. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that are in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
 - 1. Level and plumb individual members of structure. Slope roof framing members to slopes indicated on Drawings.
 - 2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.
- E. Splice members only where indicated.
- F. Do not use thermal cutting during erection unless approved by Architect. Finish thermally cut sections within smoothness limits in AWS D1.1/D1.1M.
- G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

3.4 FIELD CONNECTIONS

- A. High-Strength Bolts: Install high-strength bolts in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts" for bolt and joint type specified.
 - 1. Joint Type: Snug tightened.
- B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
 - 1. Comply with ANSI/AISC 303 and ANSI/AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
 - 2. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in ANSI/AISC 303 for mill material.

3.5 REPAIR

- A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing, and repair galvanizing to comply with ASTM A780/A780M.
- B. Touchup Painting:
 - 1. Immediately after erection, clean exposed areas where primer is damaged or missing, and paint with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - a. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.

END OF SECTION 051200

DIVISION 5 - METALS
SECTION 054000 - COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Exterior wall furring channels (Hat Channels).
- B. Related Requirements:
 - 1. Section 05 50 00 "Metal Fabrications" for miscellaneous steel shapes, and connections used with cold-formed metal framing.
 - 2. Section 09 22 16 "Non-Structural Metal Framing" for resilient furring channels.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of code-compliance certification for studs and tracks.
- B. Product Test Reports: For each listed product, for tests performed by manufacturer and witnessed by a qualified testing agency a qualified testing agency.
 - 1. Steel sheet.
 - 2. Expansion anchors.
 - 3. Power-actuated anchors.
 - 4. Mechanical fasteners.
 - 5. Hat Channels (Furring Channels).
 - 6. Miscellaneous structural clips and accessories.

1.5 QUALITY ASSURANCE

- A. Product Tests: Mill certificates or data from a qualified independent testing agency indicating steel sheet complies with requirements, including base-metal thickness, yield strength, tensile strength, total elongation, chemical requirements, and metallic-coating thickness.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. AllSteel & Gypsum Products, Inc.
 2. Clark Dietrich Building Systems.

2.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide cold-formed steel framing capable of withstanding design loads within limits and under conditions indicated.
1. Design Loads: As indicated on Drawings.
 2. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:
 - a. Exterior Non-Load-Bearing Framing: Horizontal deflection of 1/360 of the wall height.
 3. Design framing systems to provide for movement of framing members located outside the insulated building envelope without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 deg F.
 4. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure as follows:
 - a. Upward and downward movement of 1/2 inch.
 5. Design exterior non-load-bearing wall framing to accommodate horizontal deflection without regard for contribution of sheathing materials.
- B. Cold-Formed Steel Framing Standards: Unless more stringent requirements are indicated, framing shall comply with AISI S100, AISI S200, and the following:
1. Lateral Design: AISI S213.

2.3 COLD-FORMED STEEL FRAMING MATERIALS

- A. Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating designation as follows:
1. Grade: ST33H.
 2. Coating: G60 (Z180).

2.4 EXTERIOR NON-LOAD-BEARING WALL FRAMING

- A. Furring Channel / Hat Channel: Manufacturer's standard 1-1/2-inch-deep Hat-shaped furring channel, of web depths indicated, punched, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: 0.0538 inch, 54 mil, 16 gauge
2. Depth: 1-1/2 inch.
3. Width at Top of Hat: 1-1/4 inch.
4. Overall Width at Base: 2-11/16 inch.
5. Flange Width: 1/2 inch.
6. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. **AllSteel & Gypsum Products, Inc.**
 - b. **Clark Dietrich**

2.5 FRAMING ACCESSORIES

- A. Fabricate steel-framing accessories from ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated steel sheet, of same grade and coating designation used for framing members.
- B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:
 1. Supplementary framing.
 2. Anchor clips.
 3. End clips.

2.6 ANCHORS, CLIPS, AND FASTENERS

- A. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123/A 123M.
- B. Anchor Bolts: ASTM F 1554, Grade 36, threaded carbon-steel hex-headed bolts, headless, hooked bolts, headless bolts, with encased end threaded, carbon-steel nuts, and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A 153/A 153M, Class C.
- C. Post-Installed Anchors: Fastener systems with bolts of same basic metal as fastened metal, if visible, unless otherwise indicated; with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01 ICC-ES AC193 ICC-ES AC58 or ICC-ES AC308 as appropriate for the substrate.
 1. Uses: Securing cold-formed steel framing to structure.
 2. Type: Torque-controlled expansion anchor Torque-controlled adhesive anchor or adhesive anchor.
 3. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.
- D. Power-Actuated Anchors: Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- E. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws.
 1. Head Type: Low-profile head beneath sheathing; manufacturer's standard elsewhere.

2.7 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: ASTM A 780/A 780M MIL-P-21035B or SSPC-Paint 20.
- B. Shims: Load-bearing, high-density, multimonomer, nonleaching plastic; or cold-formed steel of same grade and metallic coating as framing members supported by shims.

2.8 FABRICATION

- A. Fabricate cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.
 - 1. Fabricate framing assemblies using jigs or templates.
 - 2. Cut framing members by sawing or shearing; do not torch cut.
 - 3. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, pneumatic pin fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.
 - a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - b. Locate mechanical fasteners and install according to Shop Drawings, with screws penetrating joined members by no fewer than three exposed screw threads.
 - 4. Fasten other materials to cold-formed steel framing by welding, bolting, pneumatic pin fastening, or screw fastening, according to Shop Drawings.
- B. Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable variation of 1/8 inch in 10 feet and as follows:
 - 1. Spacing: Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
 - 2. Squareness: Fabricate each cold-formed steel framing assembly to a maximum out-of-square tolerance of 1/8 inch.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, conditions, and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Cold-formed steel framing may be shop or field fabricated for installation, or it may be field assembled.
- B. Install cold-formed steel framing according to AISI S200, AISI S202, and manufacturer's written instructions unless more stringent requirements are indicated.

- C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.
 - 1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch.
- D. Install cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened.
 - 1. Cut framing members by sawing or shearing; do not torch cut.
 - 2. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.
 - a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - b. Locate mechanical fasteners, install according to Shop Drawings, and comply with requirements for spacing, edge distances, and screw penetration.
- E. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.
- F. Install temporary bracing and supports to secure framing and support loads equal to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.
- G. Do not bridge building expansion joints with cold-formed steel framing. Independently frame both sides of joints.
- H. Install insulation, specified in Section 072100 "Thermal Insulation," in framing-assembly members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.
- I. Fasten hole-reinforcing plate over web penetrations that exceed size of manufacturer's approved or standard punched openings.

3.3 EXTERIOR FURRING CHANNEL / HAT CHANNEL INSTALLATION

- A. Install horizontal furring channels (hat channels) in walls, spaced vertically in rows indicated but not more than 48 inches apart. Fasten at each stud intersection.
 - 1. Furring Channels: Cold-rolled steel hat channel, mechanically fastened to studs with a minimum of two screws into each flange of the furring channel.
- B. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.4 ERECTION TOLERANCES

- A. Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:

1. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.5 REPAIRS AND PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint according to ASTM A 780/A 780M and manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed steel framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 054000

DIVISION 6 - WOOD AND PLASTICS

SECTION 061000 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Framing with dimension lumber.
 - 2. Wood furring, grounds, nailers, and blocking.
 - 3. Sheathing.

1.3 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product Data for the following products:
 - 1. Engineered wood products.
 - 2. Insulating sheathing.
 - 3. Metal framing anchors.
 - 4. Construction adhesives.
- C. Material certificates for dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the American Lumber Standards Committee's (ALSC) Board of Review.
- D. Wood treatment data as follows, including chemical treatment manufacturer's instructions for handling, storing, installing, and finishing treated materials:
 - 1. For each type of preservative-treated wood product, include certification by treating plant stating type of preservative solution and pressure process used, net amount of preservative retained, and compliance with applicable standards.
 - 2. For waterborne-treated products, include statement that moisture content of treated materials was reduced to levels indicated before shipment to Project site.
- E. Material test reports from a qualified independent testing agency indicating and interpreting test results relative to compliance of fire-retardant-treated wood products with requirements indicated.
- F. Warranty of chemical treatment manufacturer for each type of treatment.
- G. Research or evaluation reports of the model code organization acceptable to authorities having jurisdiction that evidence the following products' compliance with building code in effect for Project.
 - 1. Engineered wood products.
 - 2. Metal framing anchors.
 - 3. Power-driven fasteners.

1.4 QUALITY ASSURANCE

- A. Single-Source Responsibility for Engineered Wood Products: Obtain each type of engineered wood product from one source and by a single manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Keep materials under cover and dry. Protect from weather and contact with damp or wet surfaces. Stack lumber, plywood, and other panels. Provide for air circulation within and around stacks and under temporary coverings.
 - 1. For lumber and plywood pressure treated with waterborne chemicals, place spacers between each bundle to provide air circulation.

PART 2 - PRODUCTS

2.1 LUMBER, GENERAL

- A. Lumber Standards: Comply with DOC PS 20, "American Softwood Lumber Standard," and with applicable grading rules of inspection agencies certified by ALSC's Board of Review.
- B. Inspection Agencies: Inspection agencies, and the abbreviations used to reference them, include the following:
 - 1. SPIB - Southern Pine Inspection Bureau.
 - 2. WWPA - Western Wood Products Association.
- C. Grade Stamps: Provide lumber with each piece factory marked with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill.
 - 1. For exposed lumber, furnish pieces with grade stamps applied to ends or back of each piece, or omit grade stamps and provide grade-compliance certificates issued by inspection agency.
- D. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
 - 1. Provide dressed lumber, S4S, unless otherwise indicated.
 - 2. Provide dry lumber with 19 percent maximum moisture content at time of dressing for 2-inch nominal (38-mm actual) thickness or less, unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. General: Where lumber or plywood is indicated as preservative treated or is specified to be treated, comply with applicable requirements of AWPAC2 (lumber) and AWPAC9 (plywood). Mark each treated item with the Quality Mark Requirements of an inspection agency approved by ALSC's Board of Review.
 - 1. Do not use chemicals containing chromium or arsenic.
 - 2. For exposed items indicated to receive stained finish, use chemical formulations that do not bleed through, contain colorants, or otherwise adversely affect finishes.
- B. Pressure treat aboveground items with waterborne preservatives to a minimum retention of 0.25 lb/cu. ft. (4.0 kg/cu. m). After treatment, kiln-dry lumber and plywood to a maximum moisture content of 19 and 15 percent, respectively. Treat indicated items and the following:

1. Wood cants, sills, sleepers, blocking, nailers, furring, stripping, and similar concealed members in direct contact with masonry or concrete. (Note: Wood nailers, curbs, equipment support bases, blocking, stripping, and similar members that are not in direct contact with concrete or masonry and which are to be covered by roofing, flashing, vapor barriers, or waterproofing are not required to be preservative treated).
 2. Wood floor plates installed over concrete slabs directly in contact with earth.
 3. Exterior exposed wood and wood fence rails and fence and gate framing.
- C. Pressure treat wood members in contact with ground or freshwater with waterborne preservatives to a minimum retention of 0.40 lb/cu. ft. (6.4 kg/cu. m).
- D. Complete fabrication of treated items before treatment, where possible. If cut after treatment, apply field treatment complying with AWPA M4 to cut surfaces. Inspect each piece of lumber or plywood after drying and discard damaged or defective pieces.
- E. Provide asphaltic membrane separator sheet to isolate treated wood from contact with steel and aluminum.

2.3 DIMENSION LUMBER

- A. General: Provide dimension lumber of grades indicated according to the ALSC National Grading Rule (NGR) provisions of the inspection agency indicated.
- B. Provide framing of the following grade and species:
1. Grade: No. 2.
 2. Species: Southern pine; SPIB.

2.4 BOARDS

- A. Concealed Boards: Where boards will be concealed by other work, provide lumber with 15 percent maximum moisture content and of following species and grade:
1. Species and Grade: Mixed southern pine, No. 2 per SPIB rules.

2.5 MISCELLANEOUS LUMBER

- A. General: Provide lumber for support or attachment of other construction, including rooftop equipment curbs and support bases, can't strips, bucks, nailers, blocking, furring, grounds, stripping, and similar members.
- B. Fabricate miscellaneous lumber from dimension lumber of sizes indicated and into shapes shown.
- C. Moisture Content: 15 percent maximum for lumber items not specified to receive wood preservative treatment.
- D. Grade: No. 2 grade per SPIB.

2.6 ENGINEERED WOOD PRODUCTS

- A. General: Provide engineered wood products acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that evidence compliance with building code in effect for Project.
1. Allowable Design Stresses: Provide engineered wood products with allowable design stresses, as published by manufacturer, that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis, and

demonstrated by comprehensive testing performed by a qualified independent testing agency.

2.7 WOOD-BASED STRUCTURAL-USE PANELS, GENERAL

- A. Structural-Use Panel Standards: Provide either all-veneer, mat-formed, or composite panels complying with DOC PS 2, "Performance Standard for Wood-Based Structural-Use Panels," unless otherwise indicated. Provide plywood panels complying with DOC PS 1, "U.S. Product Standard for Construction and Industrial Plywood," where plywood is indicated.
- B. Structural-Use Panel Standard: Provide plywood panels complying with DOC PS 1, "U.S. Product Standard for Construction and Industrial Plywood."
- C. Trademark: Factory mark structural-use panels with APA trademark evidencing compliance with grade requirements.

2.8 CONCEALED, PERFORMANCE-RATED STRUCTURAL-USE PANELS

- A. General: Where structural-use panels are indicated for the following concealed types of applications, provide APA-performance-rated panels complying with requirements designated under each application for grade, span rating, exposure durability classification, and edge detail (where applicable).
 - 1. Thickness: Provide panels meeting requirements specified but not less than thickness indicated.
 - 2. Span Ratings: Provide panels with span ratings required to meet "Code Plus" provisions of APA Form No. E30, "APA Design/Construction Guide: Residential & Commercial."
- B. Roof Sheathing: APA-rated sheathing; 5/8 inch thick, CDX.
 - 1. Exposure Durability Classification: Exterior.
 - 2. Span Rating: As required to suit rafter spacing indicated.
- C. Wall Sheathing: APA-rated sheathing; 1/2 inch thick, CDX
 - 1. Exposure Durability Classification: Exterior.

2.9 STRUCTURAL-USE PANELS FOR BACKING

- A. Plywood Backing Panels: For mounting electrical or telephone equipment, provide fire-retardant-treated plywood panels with grade, C-D Plugged Exposure 1, in thickness indicated or, if not otherwise indicated, not less than 15/32 inch (11.9 mm) thick.

2.10 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
 - 1. Where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with a hot-dip zinc coating per ASTM A 153 or of Type 304 stainless steel.
 - 2. Fasteners and fittings for use in contact with treated wood shall be 300 or 400 series stainless steel.
- B. Nails, Wire, Brads, and Staples: FS FF-N-105.
- C. Power-Driven Fasteners: CABO NER-272.

- D. Wood Screws: ASME B18.6.1.
- E. Lag Bolts: ASME B18.2.1. (ASME B18.2.3.8M)
- F. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.

2.11 METAL FRAMING ANCHORS

- A. General: Provide galvanized steel framing anchors of structural capacity, type, and size indicated and as follows:
 - 1. Research or Evaluation Reports: Provide products for which model code research or evaluation reports exist that are acceptable to authorities having jurisdiction and that evidence compliance of metal framing anchors for application indicated with building code in effect for Project.
 - 2. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer, that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis, and demonstrated by comprehensive testing performed by a qualified independent testing agency.
- B. Galvanized Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653, G60 (ASTM A 653M, Z180) coating designation; structural, commercial, or lock-forming quality, as standard with manufacturer for type of anchor indicated.
- C. Joist Hangers: U-shaped joist hangers with 2-inch- (50-mm-) long seat and 1-1/4-inch- (32-mm-) wide nailing flanges at least 85 percent of joist depth.
 - 1. Minimum Thickness: 0.064 inch (1.6 mm).
- D. Top Flange Hangers: U-shaped joist hangers, full depth of joist, formed from metal strap with tabs bent to extend over and be fastened to supporting member.
 - 1. Strap Width: 2 inches (50 mm).
 - 2. Thickness (for welded hangers): 0.0747 inch (14 gauge).
 - 3. Equal to Simpson Strongtie type LB series.
 - a. Type LB210 for 2x10 joists.
 - 4. Weld both tabs to steel beam with 1/8" fillet welds x 1" long at each connection.
 - 5. Nail to each end of each joist or purlin with nails of size, type and quantity as recommended by hanger manufacturer.
- E. Bridging: Rigid, V-section, nailless type, 0.064 inch (1.6 mm) thick, length to suit joist size and spacing.
- F. Joist Ties: Flat straps, with holes for fasteners, for tying joists together over supports.
 - 1. Width: 1-1/4 inches (32 mm).
 - 2. Thickness: 0.064 inch (1.6 mm).
 - 3. Length: As required.
- G. Truss and Rafter Tie-Downs (Hurricane Ties): Bent strap tie for fastening rafters or roof trusses to wall studs below, 1-9/16 inches (39.7 mm) by 1-9/16 inches (39.7 mm) by 4-5/8" (117.5 mm) long by 0.052 inch (1.3 mm) thick. Provide Simpson "Strong-Tie" model no. H3, or approved equal.
- H. Wall Tie-Down Straps : Straight strap tie for fastening wall studs to floor joists and wood sill below, 1-1/2 inches (38.1 mm) wide by 22 5/16 inches (566.74 mm) long by 16 gauge (0.0625 inch)

(1.59 mm) thick. Locate at 32 inches (813 mm) o.c., on alternate studs. Provide Simpson "Strong-Tie" model no. RPS22, or approved equal.

2.14 MISCELLANEOUS MATERIALS

- A. Separator Sheet to isolate treated wood from contact with metals: approved commercial grade Peel & Stick flexible asphaltic membrane flashing, fabricated in strip form, for use as a separator sheet to isolate treated wood from contact with steel and aluminum, and selected from manufacturer's standard widths to suit application.
- B. Adhesives for Field Gluing Panels to Framing: Formulation complying with APA AFG-01 that is approved for use with type of construction panel indicated by both adhesive and panel manufacturers.
- C. Water-Repellent Preservative: NWWDA-tested and -accepted formulation containing 3-iodo-2-propynyl butyl carbonate (IPBC) as its active ingredient.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Discard units of material with defects that impair quality of rough carpentry and that are too small to use with minimum number of joints or optimum joint arrangement.
- B. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted.
- C. Fit rough carpentry to other construction; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds, and similar supports to allow attachment of other construction.
- D. Apply field treatment complying with AWPA M4 to cut surfaces of preservative-treated lumber and plywood.
- E. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. CABO NER-272 for power-driven staples, P-nails, and allied fasteners.
 - 2. Published requirements of metal framing anchor manufacturer.
 - 3. "Recommended Nailing Schedule" of referenced framing standard and with AFPA's "National Design Specifications for Wood Construction."
 - 4. "Table 2304.10.1--Fastening Schedule," of the International Building Code.
 - 5. At exterior walls: Anchor wood sill plates to concrete slab with minimum ½" diameter bent anchor bolts with 7" minimum embedment. Space anchor bolts 48" maximum on center and 6" from each end of each piece, with minimum of two (2) anchor bolts per piece.
- F. Use common wire nails, unless otherwise indicated. Use finishing nails for finish work. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; predrill as required.
- G. Use hot-dip galvanized or stainless-steel nails where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity.
- H. Countersink nail heads on exposed carpentry work and fill holes with wood filler.

3.2 WOOD GROUNDS, NAILERS, BLOCKING, AND SLEEPERS

- A. Install wood grounds, nailers, blocking, and sleepers where shown and where required for screeding or attaching other work. Form to shapes shown and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- B. Attach to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated. Build into masonry during installation of masonry work. Where possible, anchor to formwork before concrete placement.

- C. Install permanent grounds of dressed, preservative-treated, key-beveled lumber not less than 1-1/2 inches (38 mm) wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

3.3 WOOD FURRING

- A. Install plumb and level with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.
 - 1. Firestop furred spaces of walls at each floor level and at ceiling with wood blocking or non-combustible materials, accurately fitted to close furred spaces.
- B. Furring to Receive Gypsum Board: Install 1-by-2-inch nominal- (19-by-38-mm actual-) size furring at 16 inches (406 mm) o.c., vertically.

3.4 WOOD FRAMING, GENERAL

- A. Framing Standard: Comply with AFPA's "Manual for Wood Frame Construction," unless otherwise indicated.
- B. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.
- C. Install framing members of size and at spacing indicated.
- D. Do not splice structural members between supports.
- E. Firestop concealed spaces of wood-framed walls and partitions at each floor level and at ceiling line of top story. Where firestopping is not inherent in framing system used, provide closely fitted wood blocks of 2-inch nominal- (38-mm actual-) thickness lumber of same width as framing members.

3.5 WALL AND PARTITION FRAMING

- A. General: Arrange studs so that wide face of stud is perpendicular to direction of wall or partition and narrow face is parallel. Provide single bottom plate and double top plates using members of 2-inch nominal (38-mm actual) thickness whose widths equal that of studs; except single top plate may be used for non-load-bearing partitions. Nail or anchor plates to supporting construction, unless otherwise indicated.
 - 1. For exterior walls, provide 2-by-6-inch nominal-size wood studs spaced 16 inches (406 mm) o.c., except where otherwise indicated or required.
 - 2. For interior partitions and walls, provide 2-by-4-inch nominal- (38-by-89-mm actual-size) wood studs spaced 16 inches (406 mm) o.c., except where otherwise indicated or required.
 - 3. At all exterior walls and interior partitions install 3 continuous beads of sealant to bottom plate.
- B. Construct corners and intersections with 3 or more studs. Provide miscellaneous blocking and framing as shown and as required to support facing materials, fixtures, specialty items, and trim.
 - 1. Provide continuous horizontal blocking at midheight of single-story partitions over 96 inches (2438 mm) high and multistory partitions, using members of 2-inch nominal (38-mm actual) thickness and of same width as wall or partitions.
- C. Frame openings with multiple studs and headers. Provide nailed header members of thickness equal to width of studs. Set headers on edge and support on jamb studs.
 - 1. For non-load-bearing partitions, provide double-jamb studs with headers not less than 4-inch nominal (89-mm actual) depth for openings 36 inches (900 mm) and less in width, and not less than 6-inch nominal (140-mm actual) depth for wider openings.

2. For load-bearing walls, provide double-jamb studs for openings 72 inches (1800 mm) and less in width, and triple-jamb studs for wider openings. Provide headers of depth shown or, if not shown, as recommended by AFPA's "Manual for Wood Frame Construction."
- D. Provide bracing in exterior walls, at both walls of each external corner, full-story height, unless otherwise indicated. Provide one of the following:
- E. Provide bracing in walls, at locations indicated, full-story height, unless otherwise indicated. Provide one of the following:
 1. Plywood panels, not less than 48 by 96 inches (1219 by 2438 mm) applied vertically.

3.6 RAFTER AND CEILING JOIST FRAMING

- A. Ceiling Joists: Install ceiling joists with crown edge up and complying with requirements specified above for floor joists. Face nail to ends of parallel rafters.
 1. Where ceiling joists are at right angles to rafters, provide additional short joists perpendicular to rafters from wall plate to first joist; nail to ends of rafters and to top plate and nail to first joist or anchor with framing anchors or metal straps. Provide 1-by-8-inch nominal- (19-by-184-mm actual-) size or 2-by-4-inch nominal- (38-by-89-mm actual-) size stringers spaced 48 inches (1200 mm) o.c. crosswise over main ceiling joists.
- B. Rafters: Notch to fit exterior wall plates and use metal framing anchors. Double rafters to form headers and trimmers at openings in roof framing, if any, and support with metal hangers. Where rafters abut at ridge, place directly opposite each other and nail to ridge member using metal ridge hangers.
 1. At valleys, provide double-valley rafters of size shown or, if not shown, of same thickness as regular rafters and 2 inches (50 mm) deeper. Bevel ends of jack rafters for full bearing against valley rafters.
 2. At hips, provide hip rafter of size shown or, if not shown, of same thickness as regular rafters and 2 inches (50 mm) deeper. Bevel ends of jack rafters for full bearing against hip rafter.
- C. Provide collar beams (ties) as shown or, if not shown, provide 1-by-6-inch nominal- (19-by-140-mm actual-) size boards between every third pair of rafters, but not more than 48 inches (1219 mm) o.c. Locate below ridge member, at third point of rafter span. Cut ends to fit roof slope and nail to rafters.
- D. Provide special framing as shown for eaves, overhangs, dormers, and similar conditions, if any.

3.7 INSTALLATION OF STRUCTURAL-USE PANELS

- A. General: Comply with applicable recommendations contained in APA Form No. E30, "APA Design/Construction Guide: Residential & Commercial," for types of structural-use panels and applications indicated.
 1. Comply with "Code Plus" provisions of above-referenced guide.
- B. Fastening Methods: Fasten panels as indicated below:
 1. Sheathing: Nail to framing.
 - a. Space panels 1/8 inch (3 mm) at edges and ends.

- b. Provide solid wood blocking or metal panel clips at all unsupported panel edges. Provide one (1) panel clip per span less than 48 inches (1219 mm) and two (2) panel clips for 48 inch (1219 mm) or longer spans.
 - c. Space panels 1/8 inch (3 mm) at edges and ends.
- 2. Plywood Backing Panels: Nail or screw to supports.

END OF SECTION

DIVISION 6 – WOOD AND PLASTICS

SECTION 061753 - SHOP-FABRICATED WOOD TRUSSES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Wood products.
2. Metal-Plate-Connected Wood Trusses
3. Metal Connector Plates
4. Metal Truss Hangers
5. Hurricane Ties

1.2 DEFINITIONS

- A. Metal-Plate-Connected Wood Trusses: Planar structural units consisting of metal-plate-connected members fabricated from dimension lumber and cut and assembled before delivery to Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For metal-plate connectors, metal truss accessories, and fasteners.
- B. Shop Drawings: Show fabrication and installation details for trusses.
1. Show location, pitch, span, camber, configuration, and spacing for each type of truss required.
 2. Indicate sizes, stress grades, and species of lumber.
 3. Indicate locations, sizes, and materials for permanent bracing required to prevent buckling of individual truss members due to design loads.
 4. Indicate type, size, material, finish, design values, orientation, and location of metal connector plates.
 5. Show splice details and bearing details.
- C. Delegated Design Submittals: For metal-plate-connected wood trusses indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For metal connector-plate manufacturer.
- B. Material Certificates: For dimension lumber specified to comply with minimum specific

gravity. Indicate species and grade selected for each use and specific gravity.

- C. Product Certificates: For metal-plate-connected wood trusses, signed by officer of truss-fabricating firm.
- D. Evaluation Reports: For the following, from ICC-ES:
 - 1. Metal-plate connectors.
 - 2. Metal truss accessories.

1.5 QUALITY ASSURANCE

- A. Metal Connector-Plate Manufacturer Qualifications: A manufacturer that is a member of TPI and that complies with quality-control procedures in TPI 1 for manufacture of connector plates.
 - 1. Manufacturer's responsibilities include providing professional engineering services needed to assume engineering responsibility.
 - 2. Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.
 - 3. Single-Source Engineering Responsibility: Provide trusses and bracing engineered by metal-plate connector manufacturer to support superimposed dead, and live loads, and wind loads indicated, with design of trusses and bracing approved and certified by a qualified professional engineer.
 - 4. Professional Engineer Qualifications: A professional engineer who is legally authorized to practice in the jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated that have resulted in installing metal-plate-connected wood trusses and bracing similar to those indicated for this Project and with a record of successful in-service performance.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Handle and store trusses to comply with recommendations in SBCA BCSI, "Building Component Safety Information: Guide to Good Practice for Handling, Installing, Restraining, & Bracing Metal Plate Connected Wood Trusses."
 - 1. Store trusses flat, off of ground, and adequately supported to prevent lateral bending.
 - 2. Protect trusses from weather by covering with waterproof sheeting, securely anchored.
 - 3. Provide for air circulation around stacks and under coverings.
- B. Inspect trusses showing discoloration, corrosion, or other evidence of deterioration. Discard and replace trusses that are damaged or defective.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design metal-plate-connected wood trusses.
 - 1. and to prepare calculations, Shop Drawings, bracing drawings and other structural data for metal-plate-connected wood trusses.
- B. Structural Performance: Metal-plate-connected wood trusses are to be capable of withstanding design loads within limits and under conditions indicated. Comply with requirements in TPI 1 unless more stringent requirements are specified below.
 - 1. Design Loads: As indicated.
 - a. Roof Live Load: 20 lbs./sq. ft.
 - b. Wind Loads: Per IBC / ASCE 7
 - c. Top Chord Dead Load: 10 lbs./sq. ft.
 - d. Bottom Chord Dead Load: 10 lbs./sq. ft.
 - 2. Maximum Deflection under Design Loads:
 - a. Roof Trusses: Vertical deflection of 1/360 of span.
 - b. Roof Trusses-1: Horizontal deflection at reactions of 1-1/4" inches (32mm) due to total load.
- C. Comply with applicable requirements and recommendations of TPI 1, TPI DSB, and SBCA BCSI.
- D. Wood Structural Design Standard: Comply with applicable requirements in AF&PA's "National Design Specifications for Wood Construction" and its "Supplement."

2.2 WOOD PRODUCTS

- A. Lumber: DOC PS 20 and applicable rules of any rules-writing agency certified by the American Lumber Standard Committee (ALSC) Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
 - 1. Factory mark each piece of lumber with grade stamp of grading agency.
 - 2. For exposed lumber indicated to receive a stained or natural finish, omit grade stamp and provide certificates of grade compliance issued by grading agency.
 - 3. Provide dressed lumber, S4S.
 - 4. Provide dry lumber with 15 percent maximum moisture content at time of dressing.
 - 5. Species: Southern pine graded per SPIB rules.
 - a. SPIB - Southern Pine Inspection Bureau.
- B. Minimum Chord Size for Roof Trusses: 2 by 6 inches nominal for both top and bottom

chords.

1. Grade for Chord Members: No. 2

C. Grade for Web Members: No. 2

D. Permanent Bracing: Provide wood bracing that complies with requirements for miscellaneous lumber in Section 061000 "Rough Carpentry."

1. Grade for Bracing Members: No. 2 (Minimum nominal size shall be 2 x 4 x continuous).

2.3 METAL CONNECTOR PLATES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Alpine, a division of ITW Inc.
2. MiTek Industries, Inc.

B. Fabricate connector plates to comply with TPI 1.

C. Hot-Dip Galvanized-Steel Sheet: ASTM A653/A653M; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G60 coating designation; and not less than 0.036 inch thick.

1. Use for interior locations unless otherwise indicated.

2.4 FASTENERS

A. Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. Provide fasteners for use with metal framing anchors that comply with written recommendations of metal framing manufacturer.
2. Where trusses are exposed to weather, in ground contact, made from pressure-preservative treated wood, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M.

B. Nails, Brads, and Staples: ASTM F1667.

2.5 METAL FRAMING ANCHORS AND ACCESSORIES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Simpson Strong-Tie Company, Inc.

- B. Allowable design loads, as published by manufacturer, are to comply with or exceed those of basis-of-design products. Manufacturer's published values are to be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency. Framing anchors are to be punched for fasteners adequate to withstand same loads as framing anchors.
- C. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A653/A653M, G60 coating designation.
 - 1. Use for interior locations unless otherwise indicated.
- D. Truss Tie-Downs: Hurricane ties for fastening roof trusses to wall below, 5-9/16" x 3-5/16" wide by 0.0625 inch thick.
 - 1. Fasten each end of each truss to wall top plate.
 - 2. Equal to Simpson TC26
- E. Roof Truss Clips: Angle clips for bracing bottom chord of roof trusses at non-load-bearing walls, 1-1/4 inches wide by 0.050 inch thick. Clip is fastened to truss through slotted holes to allow for truss deflection.
- F. Roof Truss Bracing/Spacers: U-shaped channels, 1-1/2 inches wide by 1 inch deep by 0.040 inch thick, made to fit between two adjacent trusses and accurately space them apart, and with tabs having metal teeth for fastening to trusses.
- G. Drag Strut Connectors: Angle clip with one leg extended for fastening to the side of girder truss.
 - 1. Angle clip is 3 by 3 by 0.179 by 8 inches with extended leg 8 inches long. Connector has galvanized finish.
 - 2. Angle clip is 3 by 3 by 0.239 by 10-1/2 inches with extended leg 10-1/2 inches long. Connector has painted finish.

2.6 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: SSPC-Paint 20, with dry film containing a minimum of 92 percent zinc dust by weight.

2.7 FABRICATION

- A. Cut truss members to accurate lengths, angles, and sizes to produce close-fitting joints.
- B. Fabricate metal connector plates to sizes, configurations, thicknesses, and anchorage details required to withstand design loads for types of joint designs indicated.
- C. Assemble truss members in design configuration indicated; use jigs or other means to ensure uniformity and accuracy of assembly, with joints closely fitted to comply with tolerances in TPI 1. Position members to produce design camber indicated.

1. Fabricate wood trusses within manufacturing tolerances in TPI 1.
- D. Connect truss members by metal connector plates located and securely embedded simultaneously in both sides of wood members by air or hydraulic press.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install wood trusses only after supporting construction is in place and is braced and secured.
- B. If trusses are delivered to Project site in more than one piece, assemble trusses before installing.
- C. Hoist trusses in place by lifting equipment suited to sizes and types of trusses required, exercising care not to damage truss members or joints by out-of-plane bending or other causes.
- D. Install and brace trusses according to TPI recommendations and as indicated.
- E. Install trusses plumb, square, and true to line and securely fasten to supporting construction.
- F. Space trusses 24 inches o.c.; adjust and align trusses in location before permanently fastening.
- G. Anchor trusses securely at bearing points; use metal truss tie-downs or truss hangers as applicable. Install fasteners through each fastener hole in metal framing anchors according to manufacturer's fastening schedules and written instructions.
- H. Securely connect each truss ply required for forming built-up girder trusses.
 1. Anchor trusses to girder trusses as indicated.
- I. Install and fasten permanent bracing during truss erection and before construction loads are applied. Anchor ends of permanent bracing where terminating at walls or beams.
 1. Install bracing to comply with Section 061000 "Rough Carpentry."
- J. Install wood trusses within installation tolerances in TPI 1.
- K. Do not alter trusses in field. Do not cut, drill, notch, or remove truss members.
- L. Replace wood trusses that are damaged or do not comply with requirements.
 1. Damaged trusses may be repaired according to truss repair details signed and sealed by the qualified professional engineer responsible for truss design, when approved by Architect.

3.2 REPAIRS AND PROTECTION

- A. Repair damaged galvanized coatings on exposed surfaces in accordance with ASTM A780/A780M and manufacturer's written instructions.

END OF SECTION 061753

DIVISION 6 – WOOD AND PLASTICS
SECTION 064023 - INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior standing and running trim for opaque finish.
2. Closet and utility shelving.
3. Miscellaneous materials.

B. Related Requirements:

1. Section 061000 "Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing interior architectural woodwork that are concealed within other construction before interior architectural woodwork installation.
2. Section 062023 "Interior Finish Carpentry" for interior carpentry exposed to view that is not specified in this Section.

1.2 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections, to ensure that interior architectural woodwork can be supported and installed as indicated.

1.3 ACTION SUBMITTALS

A. Product Data:

1. Anchors.
2. Adhesives.

B. Shop Drawings:

1. Include the following:
 - a. Dimensioned plans, elevations, and sections.
 - b. Attachment details.
2. Show large-scale details.
3. Show locations and sizes of furring, blocking, and hanging strips, including blocking and reinforcement concealed by construction and specified in other Sections.
4. Apply AWI Quality Certification Program label to Shop Drawings.

C. Samples: For each exposed product and for each color and finish specified.

1. Size:
 - a. Panel Products: 12 inches by 12 inches.

- b. Lumber Products: Not less than 5 inches wide by 12 inches long, for each species and cut, finished on one side and one edge.
- 2. Lumber for Transparent Finish: Not less than 5 inches wide by 12 inches long, for each species and cut, finished on one side and one edge.
- 3. Veneer Leaves: Representative of and selected from flitches to be used for transparent-finished interior architectural woodwork.
- 4. Lumber and Panel Products with Shop-Applied Opaque Finish: 5 inches wide by 12 inches long for lumber and 12 by 12 inches for panels, for each finish system and color.
 - a. Finish one-half of exposed surface.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For architectural woodwork manufacturer.
- B. Product Certificates: For the following:
 - 1. Composite wood products.
 - 2. Adhesives.

1.5 CLOSEOUT SUBMITTALS

- A. Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

1.6 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
 - 1. Manufacturer's Certification: Licensed participant in AWI's Quality Certification Program.
 - 2. Installer Qualifications: Manufacturer of products.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Comply with the Architectural Woodwork Standards, Section 2.
- B. Do not deliver interior architectural woodwork until painting and similar finish operations that might damage woodwork have been completed in installation areas.
- C. Store woodwork in installation areas or in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.
 - 1. Handle and store fire-retardant-treated wood to comply with chemical treatment manufacturer's written instructions.

1.8 FIELD CONDITIONS

- A. Environmental Limitations with Humidity Control: Do not deliver or install interior architectural

woodwork until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F and relative humidity between 43 and 70 percent during the remainder of the construction period.

- B. Established Dimensions: Where interior architectural woodwork is indicated to fit to other construction, establish dimensions for areas where woodwork is to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 WOODWORK, GENERAL

- A. Quality Standard: Unless otherwise indicated, comply with the Architectural Woodwork Standards for grades of interior architectural woodwork indicated for construction, finishes, installation, and other requirements.
- B. Architectural Woodwork Standards Grade: Custom.
 - 1. Wood Species: Clear, kiln-dried poplar wood trim for painted finish.
 - 2. Wood Moisture Content: 8 to 13 percent.

2.2 CLOSET AND UTILITY SHELVING

- A. Architectural Woodwork Standards Grade: Custom.
- B. Shelf Material: 3/4-inch veneer-faced panel product with solid-lumber edge.
- C. Cleats: 3/4-inch solid lumber.
- D. Wood Species: Birch Plywood, AWI "Good" Grade, close-grained birch plywood with solid lumber edging of any close-grained hardwood listed in referenced woodworking standard.
- E. Wood Closet Rods: 1-1/2-inch- diameter, red oak.
- F. Metal Rod Flanges: Aluminum.
- G. Wood Finish: Opaque finish shelf and cleats. Transparent finish rod.

2.3 HARDWOOD SHEET MATERIALS

- A. Composite Wood Products: Provide materials that comply with requirements of the Architectural Woodwork Standards for each type of interior architectural woodwork and quality grade specified unless otherwise indicated.
 - 1. Veneer-Faced Panel Products (Hardwood Plywood): HPVA HP-1.

2.4 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Nailers: Softwood or hardwood lumber, kiln-dried to less than 15 percent moisture content.

1. Preservative Treatment: Provide softwood lumber treated by pressure process, AWPAC U1; Use Category UC3b.
 - a. Provide where in contact with concrete or masonry.
 - b. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent.
 - c. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
 - d. Mark lumber with treatment quality mark of an inspection agency approved by the American Lumber Standards Committee's (ALSC) Board of Review.
- B. Provide self-drilling screws for metal-framing supports, as recommended by metal-framing manufacturer.
- C. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage.
 1. Provide metal expansion sleeves or expansion bolts for post-installed anchors.
 2. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.
- D. Adhesives: Do not use adhesives that contain urea formaldehyde.
- E. Installation Adhesive: Product recommended by fabricator for each substrate for secure anchorage.

2.5 FABRICATION

- A. Fabricate interior architectural woodwork to dimensions, profiles, and details indicated.
 1. Ease edges to radius indicated for the following:
 - a. Edges of Solid-Wood (Lumber) Members: 1/16 inch unless otherwise indicated.
 - b. Edges of Rails and Similar Members More Than 3/4 Inch (19 mm) Thick: 1/8 inch.
- B. Complete fabrication, including assembly, to maximum extent possible before shipment to Project site.
 1. Disassemble components only as necessary for shipment and installation.
 2. Where necessary for fitting at site, provide allowance for scribing, trimming, and fitting.
 3. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled.
 - a. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting.
 - b. Verify that parts fit as intended, and check measurements of assemblies against field measurements indicated on approved Shop Drawings before disassembling for shipment.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before installation, condition interior architectural woodwork to humidity conditions in installation areas for not less than 72 hours prior to beginning of installation.

- B. Before installing interior architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming of concealed surfaces.

3.2 INSTALLATION

- A. Grade: Install interior architectural woodwork to comply with same grade as item to be installed.
- B. Assemble interior architectural woodwork and complete fabrication at Project site to the extent that it was not completed during shop fabrication.
- C. Install interior architectural woodwork level, plumb, true in line, and without distortion.
 - 1. Shim as required with concealed shims.
 - 2. Install level and plumb to a tolerance of 1/8 inch in 96 inches.
- D. Scribe and cut interior architectural woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- E. Preservative-Treated Wood: Where cut or drilled in field, treat cut ends and drilled holes in accordance with AWP A M4.
- F. Anchor interior architectural woodwork to anchors or blocking built in or directly attached to substrates.
 - 1. Secure with countersunk, concealed fasteners and blind nailing.
 - 2. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with interior architectural woodwork.
 - 3. For shop-finished items, use filler matching finish of items being installed.
- G. Standing and Running Trim:
 - 1. Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to greatest extent possible.
 - 2. Do not use pieces less than 36 inches long, except where shorter single-length pieces are necessary.
 - 3. Scarf running joints and stagger in adjacent and related members.
 - 4. Fill gaps, if any, between top of base and wall with latex sealant, painted to match wall.
 - 5. Install standing and running trim with no more variation from a straight line than 1/8 inch in 96 inches.
- H. Railings:
 - 1. Install rails with no more than 1/8 inch in 96-inch variation from a straight line.
 - 2. Wall Rails: Support rails on wall brackets securely fastened to wall framing.
 - a. Space rail brackets not more than 3'-0" o.c.

3.3 REPAIR

- A. Repair damaged and defective interior architectural woodwork, where possible, to eliminate functional and visual defects and to result in interior architectural woodwork being in compliance with requirements of Architectural Woodwork Standards for the specified grade.

- B. Where not possible to repair, replace defective woodwork.
- C. Field Finish: See Section 099123 "Interior Painting" and Section 099300 "Staining and Transparent Finishing" for final finishing of installed interior architectural woodwork not indicated to be shop finished.

3.4 CLEANING

- A. Clean interior architectural woodwork on exposed and semi-exposed surfaces.

END OF SECTION 064023

DIVISION 6 – WOOD AND PLASTICS
SECTION 064116 - PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Plastic-laminate-clad architectural cabinets.
 - 2. Wood furring, blocking, shims, and hanging strips for installing plastic-laminate-clad architectural cabinets that are not concealed within other construction.
- B. Related Requirements:
 - 1. Section 06 10 00 "Rough Carpentry"
 - 2. Section 06 10 53 "Miscellaneous Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing cabinets that are concealed within other construction before cabinet installation.
 - 3. Section 06 61 16 "Plastic Laminate-Clad Architectural Cabinets" for countertops at wet sink locations or noted elsewhere by the drawings.

1.3 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to support loads imposed by installed and fully loaded cabinets.

1.4 ACTION SUBMITTALS

- A. Shop Drawings:
 - 1. Include plans, elevations, sections, and attachment details.
 - 2. Show large-scale full-size details.
 - 3. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
 - 4. Show locations and sizes of cutouts and holes for items installed in plastic-laminate architectural cabinets.
- B. Samples for Initial Selection: For each type of exposed finish.
- C. Samples for Verification: For the following:
 - 1. Thermoset Decorative Panels: 8 by 10 inches, for each color, pattern, and surface finish.

- a. Provide edge banding on one edge.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer and Installer.
- B. Product Certificates: For each type of product. the following:
 - 1. Composite wood and agrifiber products.
 - 2. Thermoset decorative panels.
 - 3. High-pressure decorative laminate.
 - 4. Adhesives.

1.6 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance and able to provide either of the following: (Clarification. Requirements are noted as providing either or item 1 or 2.)
 - 1. Manufacturer's Certification: Licensed participant in AWI's Quality Certification Program.
 - 2. Manufacturer's Certification of successful in-service performance for a minimum of 20 years.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver cabinets until painting and similar finish operations that might damage architectural cabinets have been completed in installation areas. Store cabinets in installation areas or in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install cabinets until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels planned for building occupants during the remainder of the construction period.
- B. Field Measurements: Where cabinets are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - 1. Locate concealed framing, blocking, and reinforcements that support cabinets by field measurements before being enclosed/concealed by construction, and indicate measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 ARCHITECTURAL CABINET MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Gremillion Millworks, Alexandria, LA
- C. Mardell Products, Manusra, LA
- D. Calmar Manufacturing Co., Calmar, IA
- E. Case Systems, Inc., Midland, MI
- F. Global Casework Mfg, Sugar Land, TX
- G. Jericho Woodworks, Sugar, Land, TX
- H. LSI Corp of America, Inc, Minneapolis, MN
- I. MGC Millwork, LP, Stafford, TX 9. Robert Shaw Mfg. Co., Fort Worth, TX
- J. South Texas Woodmill, Inc., Brownsville, TX
- K. Stevens Industries, Inc., Teutopolis, IL
- L. Terrill Mfg. Co., San Angelo, TX
- M. TMI Systems Design Corp, Dickenson, ND
- N. Victoria Cabinetworks, Victoria, TX

2.2 PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

- A. Quality Standard: Unless otherwise indicated, comply with the Architectural Woodwork Standards for grades of cabinets indicated for construction, finishes, installation, and other requirements.
 - 1. (Clarification: The reference noted in Paragraph A. is a reference to a quality standard for fabrication not an indication that the Manufacturer or Fabricator must be AWI Certified or that the installer must be AWI Certified.)
- B. Architectural Woodwork Standards Grade: Custom.
- C. Type of Construction: Frameless.
- D. Door and Drawer-Front Style: Flush overlay.
 - 1. Reveal Dimension: As indicated 1/4 inch.
- E. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by quality standard.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Formica Corporation.
 - b. Lamin-Art, Inc.
 - c. Pionite; a Panolam Industries International, Inc. brand.
 - d. Wilsonart LLC.

F. Laminate Cladding for Exposed Surfaces:

1. Horizontal Surfaces: Grade HGS, except as noted to receive solid surface cabinet tops, edge, splash at wet sink locations or as noted elsewhere on the drawings.
2. Vertical Surfaces: Grade VGS.
3. Edges: Grade HGS.
4. Pattern Direction: Vertically for drawer fronts, doors, and fixed panels.

G. Materials for Semiexposed Surfaces:

1. Surfaces Other Than Drawer Bodies: High-pressure decorative laminate, NEMA LD 3, Grade VGS.
 - a. Edges of Plastic-Laminate Shelves: PVC T-mold matching laminate in color, pattern, and finish.
2. Drawer Sides and Backs: Thermoset decorative panels with PVC or polyester edge banding.
3. Drawer Bottoms: Thermoset decorative panels.

H. Drawer Construction: Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.

1. Join subfronts, backs, and sides with glued rabbeted joints supplemented by mechanical fasteners or glued dovetail joints.

I. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:

1. As selected by Architect from laminate manufacturer's full range in the following categories:
 - a. Solid colors, matte finish.
 - b. Wood grains, matte finish.
 - c. Patterns, gloss matte finish.

2.3 WOOD MATERIALS

A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.

1. Wood Moisture Content: 8 to 13 percent.

B. Composite Wood and Agrifiber Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.

1. Particleboard Cores: ANSI A208.1, 45 pcf density minimum, Grade M-3.
2. Thermoset Decorative Panels: Particleboard or MDF finished with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD 3, Grade VGL, for Test Methods 3.3, 3.4, 3.6, 3.8, and 3.10.

2.4 CABINET HARDWARE AND ACCESSORIES

- A. Butt Hinges: 2-3/4-inch, five-knuckle steel hinges made from 0.095-inch- thick metal, and as follows:
 1. Semiconcealed Hinges for Overlay Doors: BHMA A156.9, B01521.
- B. Wire Pulls: Back mounted, solid metal , 4 inches long, 5/16 inch in diameterwith US26D finish. .
- C. Catches: Roller catches, BHMA A156.9, B03071.
- D. Adjustable Shelf Standards and Supports: BHMA A156.9, B04071; with shelf rests, B04081 BHMA A156.9, B04102; with shelf brackets, B04112.
 1. KV255 standards, flush-mounted, with KV256 brackets, 4 per shelf.
- E. Drawer Slides: BHMA A156.9.
 1. Grade 1 and Grade 2: Side mounted.
 - a. Type: Full extension.
 - b. Material: Zinc-plated Epoxy-coated steel with polymer rollers.
 2. Grade 1HD-100 and Grade 1HD-200: Side mounted; full-extension type; zinc-plated-steel ball-bearing slides.
 3. For drawers more than 3 inches high, but not more than 6 inches high and not more than 24 inches wide, provide Grade 1HD-100.
 4. For drawers more than 6 inches high or more than 24 inches wide, provide Grade 1HD-100.
 5. For computer keyboard drawers, provide Knap & Vogt Model No. SD-1 Grade 1 .
 6. For trash bins not more than 20 inches high and 16 inches wide, provide Grade 1HD-100.
- F. Door Locks: BHMA A156.11, E07121.
- G. Drawer Locks: BHMA A156.11, E07041.
- H. Door and Drawer Silencers: BHMA A156.16, L03011.
- I. Grommets for Cable Passage: 2 1/2 inch OD, molded-plastic grommets and matching plastic caps with slot for wire passage.
 1. Color: Brown.
- J. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.
 1. Satin Chromium Plated, Brass / Bronze Base: BHMA 626, Steel Base: BHMA 652.
- K. For concealed hardware, provide manufacturer's standard finish that complies with product

class requirements in BHMA A156.9.

2.5 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln-dried to less than 15 percent moisture content.
- B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.
- C. Adhesive for Bonding Plastic Laminate: Unpigmented contact cement.
 - 1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.

2.6 FABRICATION

- A. Fabricate architectural cabinets to dimensions, profiles, and details indicated.
- B. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
 - 1. Notify Architect seven days in advance of the dates and times architectural cabinet fabrication will be complete.
 - 2. Trial fit assemblies at manufacturer's shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements before disassembling for shipment.
- C. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
- D. Install glass to comply with applicable requirements in Section 088000 "Glazing" and in GANA's "Glazing Manual."
 - 1. For glass in frames, secure glass with removable stops.
 - 2. For exposed glass edges, polish and grind smooth.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before installation, condition cabinets to humidity conditions in installation areas for not less than 72 hours.

3.2 INSTALLATION

- A. Architectural Woodwork Standards Grade: Install cabinets to comply with quality standard grade of item to be installed.
- B. Assemble cabinets and complete fabrication at Project site to extent that it was not completed in the shop.
- C. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with wafer-head cabinet installation screws.
- D. Install cabinets level, plumb, and true in line to a tolerance of 1/8 inch in 96 inches using concealed shims.
 - 1. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
 - 2. Install cabinets without distortion so doors and drawers fit openings and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
 - 3. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches o.c. with No. 10 wafer-head screws sized for not less than 1-1/2-inch penetration into wood framing, blocking, or hanging strips or No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish.

3.3 ADJUSTING AND CLEANING

- A. Repair damaged and defective cabinets, where possible, to eliminate functional and visual defects. Where not possible to repair, replace architectural cabinets. Adjust joinery for uniform appearance.
- B. Clean, lubricate, and adjust hardware.
- C. Clean cabinets on exposed and semi exposed surfaces.

END OF SECTION 064116

DIVISION 6 – WOOD AND PLACTICS
SECTION 06 64 00 – SANITARY WALL PANELS (F.R.P. PANELS)

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Work included: Provide sanitary wall panels (F.R.P. Panels) where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.

1.02 QUALITY ASSURANCE

- A. Use adequate number of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. All materials unless otherwise indicated are to be Marlite brand.

1.03 SUBMITTALS

- A. Comply with pertinent provisions of Division 1 Section, "Submittals".
- B. Product data: Within 30 calendar days after the Contractor has received Notice to Proceed, submit:
 - 1. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
 - 2. Samples for color selection in the form of Samples of actual materials showing the full range of colors and textures available.

1.04 PRODUCT HANDLING

- A. Handle in strict conformance to manufacturer's printed instructions.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Panels: Shall be Marlite FRP, or Kemlite Glasbord FRP, or Regal Plastics high gloss FRP panels with pebbled surface, 3/32" x 4' wide by length as long as practical (8', 9', or 10' lengths). Provide Class "A" panel. Color: White.
- B. Moldings and Trim: Shall be equal to Marlite brand of shapes and lengths required for a complete installation. Color shall match panel.
- C. Adhesive: Equal to Marlite brand C-375 neoprene-based construction adhesive or where required for non-flammable adhesive use C792 adhesive.
- D. Sealant: Marlite brand MS250 clear silicone sealant, or equal.
 - 1. Marlite Service Center, Edison, NJ, Phone #: (908)225-1650; Fax #: (908)225-1665.

2.03 SUBSTITUTIONS

A. The following F.R.P. panels and moldings are approved equals:

1. "Kemlite" "Glasbord" FRP Panels with "Surfaseal", available from Distributor: Branton Industries, Inc., Baton Rouge, La.; Phone #: (504)775-1950; Fax #: (504)778-6700
2. Product Code #77043, Series #1200 F.R. 25 by "Regal Plastics" of Shreveport, La.; Phone #: (318)635-0561; 1(800)821-7909

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Workmanship: Installation should be performed in strict accordance with manufacturer's written instruction by workmen experienced in this trade and performed in a first class workmanlike manner.
- B. Moldings: All panel edges, inside and outside corners are to be finished with Marlite brand moldings appropriate to that purpose.
- C. Sealant: All molding channels and joints between the system and different materials will be sealed with clear silicone sealant.
- D. Adhesive: Adhesive will be applied in strict accordance with the instructions and under conditions recommended as appropriate to the specified adhesive being used.
- E. Cleaning: Upon completion, clean the work of this Section in accordance with the manufacturer's recommendations.

END OF SECTION

DIVISION 7 – THERMAL AND MOISTURE PROTECTION
SECTION 072100 - THERMAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Polyisocyanurate foam-plastic board insulation.
2. Glass-fiber blanket insulation.

B. Related Requirements:

1. **Section 092900 "Gypsum Board"** for sound attenuation blanket used as acoustic insulation.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

A. Installer's Certification: Listing type, manufacturer, and R-value of insulation installed in each element of the building thermal envelope.

1. Sign, date, and post the certification in a conspicuous location on Project site.

B. Product Test Reports: For each product, for tests performed by a qualified testing agency.

C. Research Reports: For foam-plastic insulation, from ICC-ES.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

B. Protect foam-plastic board insulation as follows:

1. Do not expose to sunlight except to necessary extent for period of installation and concealment.
2. Protect against ignition at all times. Do not deliver foam-plastic board materials to Project site until just before installation time.
3. Quickly complete installation and concealment of foam-plastic board insulation in each area of construction.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Maximum flame-spread and smoke-developed indexes less than **Class A, 25 and 450** when tested in accordance with ASTM E84.
- B. Fire-Resistance Ratings: Comply with ASTM E119 or UL 263; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Indicate design designations from UL's "Fire Resistance Directory" or from listings of another qualified testing agency.
- C. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
- D. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.
- E. Thermal-Resistance Value (R-Value): R-value as indicated on Drawings in accordance with ASTM C518.
 - 1. Thickness as indicated on Drawings.

2.2 POLYISOCYANURATE FOAM-PLASTIC BOARD INSULATION

- A. Polyisocyanurate Board Insulation, Foil Faced : ASTM C1289, foil faced, Type I, Class 1 or 2.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Atlas Molded Products, a division of Atlas Roofing Corporation
 - b. Atlas Polyiso Roof and Wall Insulation
 - c. Carlisle Coatings & Waterproofing Inc
 - d. DuPont de Nemours, Inc.
 - e. Hunter Panels; a Carlisle company
 - f. Johns Manville; a Berkshire Hathaway company
 - g. Rmax, A Business Unit of Sika Corporation
 - h. The Dow Chemical Company

2.3 GLASS-FIBER BLANKET INSULATION

- A. Glass-Fiber Blanket Insulation, Unfaced : ASTM C665, Type I; passing ASTM E136 for combustion characteristics.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. CertainTeed; SAINT-GOBAIN
 - b. Johns Manville; a Berkshire Hathaway company
 - c. Knauf Insulation
 - d. Owens Corning

2.4 INSULATION FASTENERS

- A. Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation of specified thickness securely in position with self-locking washer in place.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. AGM Industries, Inc
 - b. Gemco
 2. Plate: Perforated, galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
 3. Spindle: Copper-coated, low-carbon steel; fully annealed; 0.105 inch in diameter; length to suit depth of insulation.
- B. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- thick galvanized-steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than 1-1/2 inches square or in diameter.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. AGM Industries, Inc
 - b. Gemco
 2. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in the following locations:
 - a. Crawl spaces.
 - b. Ceiling plenums.
 - c. Attic spaces.
- C. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates without damaging insulation, fasteners, or substrates.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. AGM Industries, Inc
 - b. Gemco
- D. Insulation Fastener Accessories: Provide double-pointed weld pins, lagging pins, quilting pins, duct liner pins, insulation hangers, specialty washers, special caps, j-hooks, capacitor discharge annular weld pins, capacitor discharge acoustical lagging pins, and other accessory materials that are recommended in writing by insulation fastener manufacturer to produce complete insulation supports.

2.5 ACCESSORIES

- A. Insulation for Miscellaneous Voids:
1. Glass-Fiber Insulation: ASTM C764, Type II, loose fill; with maximum flame-spread and smoke-developed indexes of 5, per ASTM E84.

B. Miscellaneous Application Accessories:

1. Adhesive for Bonding Insulation: Product compatible with insulation and air and water barrier materials, and with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.
2. Crack Sealer: Closed-cell insulating foam in aerosol dispenser recommended in writing by insulation manufacturer for filling gaps in board insulation.
3. Eave Ventilation Troughs: Preformed, rigid fiberboard or plastic sheets designed and sized to fit between roof framing members and to provide ventilation between insulated attic spaces and vented eaves.
4. Detailing Foam Insulation for Voids: Urethane foam complying with AAMA 812, low expansion pressure suitable for filling insulation gaps and voids adjacent to openings to protect against water, air, and sound intrusion.
5. Wire Mesh Lath Support for Insulation: ASTM C1032.
 - a. Material: Woven wire lath 1-1/2-inch hexagonal-shaped mesh with minimum 0.0510-inch- diameter, galvanized-steel wire.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation or vapor retarders, or those that interfere with insulation attachment.

3.2 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products, applications and applicable codes.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- C. Install insulation with manufacturer's R-value label exposed after insulation is installed.
- D. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- E. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value..

3.3 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

- A. Blanket Insulation: Install in cavities formed by framing members in accordance with the following requirements:
1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
 2. Place insulation in cavities formed by framing members to produce a friction fit between

- edges of insulation and adjoining framing members.
 - 3. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
 - 4. Attics: Install eave ventilation troughs between roof framing members in insulated attic spaces at vented eaves.
 - 5. For metal-framed wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
 - 6. Where glass-fiber blankets are indicated for sound attenuation above ceilings, install unfaced blanket insulation over ceiling area in thickness indicated. Where partitions occur, extend insulation up either side of partition.
 - 7. For wood-framed construction, install blankets in accordance with ASTM C1320.
- B. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
- 1. Glass-Fiber Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft..
 - 2. Detailing Foam Insulation for Voids: Apply in accordance with manufacturer's written instructions.

3.4 INSTALLATION OF BOARD INSULATION

- A. Install board insulation in accordance with manufacturer's written instructions per project applications and conditions.

3.5 PROTECTION

- A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes.
- B. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 072100

DIVISION 7 – THERMAL AND MOISTURE PROTECTION
SECTION 072500 - WEATHER BARRIERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Building wrap.

1.2 ACTION SUBMITTALS

A. Product Data:

1. For each type of product.

- B. Product Data Submittals: For building wrap, include data on air and water-vapor permeance based on testing in accordance with referenced standards.

1.3 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For water-resistive barrier, and, flexible flashing, from ICC-ES.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified firm that is approved, authorized, certified, or licensed by the weather barrier system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's warranty.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.

1.6 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed in accordance with manufacturer's written installation instructions and warranty requirements.

1.7 WARRANTY

- A. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 WEATHER BARRIERS

- A. Building Wrap: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, when tested in accordance with ASTM E84; UV stabilized; and acceptable to authorities having jurisdiction.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. **Barricade Building Products**
 - b. **DuPont de Nemours, Inc.**
 2. Building Wrap Type: Type II, ASTM E2556/E2556M.
 3. Composition Type: Nonperforated, nonwoven polyolefin.
 4. Water-Vapor Permeance: Minimum 20 perms in accordance with ASTM E96/E96M, Desiccant Method (Procedure A).
 5. Air Permeance: Not more than 0.001 cfm/sq. ft. at 1.57 lbf/sq. ft. when tested in accordance with ASTM E2178.
 6. Allowable UV Exposure Time: Not less than 180 days.
 7. Flame Propagation Test: Materials and construction to be as tested in accordance with NFPA 285.

2.2 ACCESSORY MATERIALS

- A. Requirement: Provide primers, fasteners, seam tapes, flashing, transition strips, termination strips, joint sealants, counterflashing strips, flashing sheets and metal termination bars, termination mastic, substrate patching materials, adhesives, tapes, foam sealants, lap sealants, and other accessory materials that are recommended in writing by weather barrier manufacturer to produce a complete weather barrier assembly and that are compatible with primary weather barrier material and adjacent construction to which they may seal.

PART 3 - EXECUTION

3.1 INSTALLATION OF WEATHER BARRIERS

- A. Weather Barriers:
1. Building Paper: Comply with manufacturer's written instructions and warranty requirements.
 - a. Apply building paper horizontally with 4-inch (100 mm) overlap and 6-inch (150 mm) endlap; fasten to sheathing with galvanized staples or roofing nails.
 - b. Extend into jambs of openings and seal corners with tape.
 2. Building Wrap or Drainage Wrap: Comply with manufacturer's written instructions and warranty requirements.
 - a. Cover sheathing with building wrap with 4-inch (100 mm) minimum overlap and 6-inch (150 mm) minimum endlap.
 - b. Apply building wrap to cover upstanding flashing with 4-inch (100-mm) overlap.

- c. Seal seams, edges, fasteners and penetrations with tape.
- B. Install weather barrier accessories for a complete installation with weather barriers in accordance with manufacturers written instructions.

END OF SECTION 072500

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

SECTION 074113 - METAL WALL PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:

- 1. "R" panel siding (wall panels).

1.3 PERFORMANCE REQUIREMENTS

- A. General: Provide manufactured wall panel assemblies complying with performance requirements indicated and capable of withstanding structural movement, thermally induced movement, and exposure to weather without failure or infiltration of water into the building interior.
- B. Water Penetration: Provide manufactured wall panel assemblies with no water penetration as defined in the test method when tested according to ASTM E 1646 at a minimum differential pressure of 20 percent of inward acting, wind-load design pressure of not less than 6.24 lb/sq. ft. (300 Pa) and not more than 12.0 lb/sq. ft. (575 Pa).
- C. Wind-Uplift Resistance: Provide wall panel assemblies that meet requirements of UL 580 for Class 90 wind-uplift resistance, with securement enhanced at building corners and perimeter to resist wind loads per FM, IBC and ASCE 7-10.
- D. Movement: Accommodate movement within system without damage to components or deterioration of seals, movement within system; movement between system and perimeter components when subject to seasonal temperature cycling; dynamic loading and release of loads; and deflection of structural support framing.

1.4 SUBMITTALS

- A. Product Data: Include manufacturer's product specifications, standard details, certified product test results, and general recommendations, as applicable to materials and finishes for each component and for total panel assemblies.
- B. Samples for Initial Selection: Manufacturer's color charts or chips showing the full range of colors, textures, and patterns available for wall panels with factory-applied finishes.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer who has completed metal wall panel projects similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver panels and other components so they will not be damaged or deformed. Package panels for protection against damage during transportation or handling.
- B. Handling: Exercise care in unloading, storing, and erecting wall panels to prevent bending, warping, twisting, and surface damage.

- C. Stack materials on platforms or pallets, covered with tarpaulins or other suitable weathertight and ventilated covering. Store panels to ensure dryness. Do not store panels in contact with other materials that might cause staining, denting, or other surface damage.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify location of structural members and openings in substrates by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, either establish opening dimensions and proceed with fabricating wall panels without field measurements or allow for trimming panel units. Coordinate wall construction to ensure actual locations of structural members and to ensure opening dimensions correspond to established dimensions.

1.8 WARRANTY

- A. General Warranty: Special warranties specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
- B. Special Finish Warranty: Submit a written warranty, signed by manufacturer, covering failure of the factory-applied exterior finish on metal wall panels within the specified warranty period and agreeing to repair finish or replace wall panels that show evidence of finish deterioration. Deterioration of finish includes, but is not limited to, color fade, chalking, cracking, peeling, and loss of film integrity.
 - 1. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 METALS AND FINISHES

- A. Metallic-Coated Steel Sheet Prepainted with Coil Coating: Steel sheet metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755 (ASTM A 755M) and the following requirements:
 - 1. Hot Dip Galvanized Steel Sheet: (G-90) commercial quality coating, extra smooth primed and finished one side with Colorklad Kynar based fluoropolymer coating .
 - 2. Thickness: 26 gauge, 0.0179 inch (0.45 mm) minimum, unless otherwise indicated.
 - 3. Finish: Apply the following organic coating in thickness indicated. Furnish appropriate air-drying spray finish in matching color for touchup.
 - a. Fluoropolymer 2-Coat Coating System: Manufacturer's standard 2-coat, thermocured system composed of specially formulated inhibitive primer and fluoropolymer color top-coat containing not less than 70 percent polyvinylidene fluoride resin by weight with a total minimum dry film thickness of 1 mil and 30 percent reflective gloss when tested according to ASTM D 523.
- 1) Durability: Provide coating field tested under normal range of weather conditions for a minimum of 20 years without significant peel, blister, flake, chip, crack, or check in

finish; without chalking in excess of a chalk rating of 8 according to ASTM D 4214; and without fading in excess of 5 Hunter units.

- 2) Color: Premium grade custom color to match Architect's sample.
- 3) Reverse side shall be coated with a wash coat of .3-.4 mil dry film thickness.
- 4) Protect finished side with liquid applied factory installed strippable film for protection of the finished surface during shipping, fabrication and installation. Protect material from heat and direct sunlight to prevent deterioration of the strippable film and finished coating.

2.2 FASCIA AND WALL PANEL ASSEMBLIES

2.4 GUTTERS AND DOWNSPOUTS:

- A. Fabricate of same material and finish as wall panel metal.
- B. Form gutters and downspouts of indicated profile and size as indicated to collect and remove water. Fabricate with connection pieces.
- C. Form sections in maximum possible lengths. Hem exposed edges. Allow for expansion at joints.
- D. Fabricate support straps of same material and finish as wall panel metal. Color as selected by Architect from manufacturer's full range of available standard colors.

2.5 ROOF CURBS:

- A. Roof Curbs: Insulated metal same material as gutters, size required for equipment indicated. Designed for imposed equipment loads, anchor fasteners to equipment, counter flashed to roof system.

2.7 METAL SIDING (WALL) PANELS

- A. General: Provide siding sheets formed to general profile or configuration as indicated. Provide flashings, closers, fillers and other sheet metal accessories, factory formed of same material and finish as siding.
 1. Wall Panel Profiles:
 - c. "R" Panels: Standard "R" panel configuration (equal to "McElroy Metal "R" panel configuration or MBCI "R" panel) unless otherwise indicated.
 2. Finish: Provide shop-applied fluoropolymer finish to galvalume siding, and related trim and accessories. Fluoropolymer 2-Coat Coating System: Manufacturer's standard 2-coat, thermocured system composed of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight with a total minimum dry film thickness of 1 mil and 30 percent reflective gloss when tested according to ASTM D 523. For siding, apply finish coat on exterior facings and apply manufacturer's standard wash coat on reverse face.
 3. Color: To be selected by Architect from manufacturer's standard colors.
 4. Fasteners (mechanical fasteners): Concealed, non-corrosive type.
 5. Provide matching trim as indicated and as required.
 6. Steel Sheet: ASTM A 792/A 792M, aluminum-zinc alloy coated to AZ50/AZ150. Siding Panels: Shall be "Galvalume", prefinished with fluoropolymer finish; color as selected by Architect from manufacturer's standard colors. Metal thickness not less than 24 ga.
 7. Sheet Panel Fasteners: Manufacturer's standard system of self-tapping screws, bolts, and nuts, self-locking rivets, self-locking bolts, end-welded studs, and other suitable fasteners designed to withstand design loads.

8. Provide metal-backed neoprene washers under heads of fasteners bearing on weather side of panels.
9. Use aluminum or stainless steel fasteners for exterior application.
10. Locate and space fastenings for true vertical and horizontal alignment. Use proper type fastening tools to obtain controlled uniform compression for positive seal without rupture of neoprene washer.
11. Provide fasteners with heads matching color of siding sheets by means of plastic caps or factory applied coating.
12. Provide Flexible Closure Strips: Closed-cell, expanded cellular rubber, self-extinguishing, cut or premolded to match corrugation configuration of siding sheets. Provide where indicated and necessary to ensure weathertight construction.
13. Sealing Tape: 100% solids, pressure sensitive grey polyisobutylene compound tape with release paper backing. Not less than 1/2" wide and 1/8" thick, nonsag, nontoxic, nonstaining and permanently elastic.

2.8 MISCELLANEOUS MATERIALS

- A. General: Provide materials and accessories required for a complete wall panel assembly and as recommended by panel manufacturer, unless otherwise indicated.
- B. Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads.
 1. Use stainless-steel fasteners for exterior applications and galvanized steel fasteners for interior applications..
- D. Accessories: Unless otherwise specified, provide components required for a complete assembly including trim, copings, fasciae, mullions, sills, corner units, closures, clips, seam covers, battens, flashings, gutters, sealants, gaskets, fillers, closure strips, and similar items. Match materials and finishes of panels.
 1. Resilient vent stack flashing consisting of flexible rubber-like boot fastened to deck with flexible metal ring and mechanical fasteners and to vent with ring.
 2. Sheet metal flashing boot cover to match color of roof fastened over flexible vent flashing.
 3. Closure Strips: Closed-cell, self-extinguishing, expanded, cellular, rubber or cross-linked, polyolefin-foam flexible closure strips. Cut or premold to match configuration of panels. Provide closure strips where indicated or necessary to ensure weathertight construction.
 4. Sealing Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape.
 5. Elastomeric Joint Sealant: ASTM C 920, of base polymer, type, grade, class, and use classifications required to seal joints in wall panels and remain weathertight. Provide sealant recommended by panel manufacturer.
 6. Trim, Gutters, Down spouts, Closure Pieces, Caps, Flashing, In fills: Same material, thickness and finish as exterior wall sheets. Brake form to required profiles. All end laps to be minimum 102 MM, (4"), and sealed with urethane sealant.
 - a. When flashing and trim are not detailed, follow Architectural Sheet Metal Manual, SMACNA, latest edition, for detailing, installation methods and practices.
- F. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil (0.4-mm) dry film thickness per coat, unless otherwise indicated. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.
- G. Expansion-Joint Sealant: For hooked-type expansion joints that must be free to move, provide nonsetting, nonhardening, nonmigrating, heavy-bodied polyisobutylene sealant.
- H. Primer: Rust-inhibitive primer recommended by panel manufacturer for finish coat.

2.9 FABRICATION

- A. General: Fabricate and finish panels and accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. Fabricate panel joints with captive gaskets or separator strips that provide a tight seal and prevent metal-to-metal contact, in a manner that will minimize noise from movements within panel assembly.

2.10 PANEL SUPPORTS AND ANCHORAGE

- A. Secondary Framing: Provide components complying with the Light Gage Structural Institute's "Guide Specifications," Section 07410, "Manufactured Roof and Wall Panels."
 - 1. Secondary structural members, except columns and beams, shall be manufacturer's standard sections fabricated from 0.0598-inch- (1.5-mm-) thick (unless otherwise indicated), cold-formed galvanized steel.
 - 2. Provide galvanized lightgauge steel supplemental framing to consist of 1-1/2" x 20 gauge (minimum) furring "hat" channels and 2-1/2" x 20 gauge (minimum) "CEE" stud/joists as required to limit unsupported span of soffit panels to 2'-0" maximum and to limit unsupported span of fascia/wall panels to 2'-6" maximum, unless otherwise indicated. Frame "hat" channels perpendicular to 2-1/2" stud/joists and provide and install diagonal bracing as required for lateral stability.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements indicated for conditions affecting performance of metal wall panels.
 - 1. Panel Supports and Anchorage: Examine wall framing to verify that studs, angles, channels, and other secondary structural panel support members and anchorage have been installed according to written instructions of panel manufacturer.
 - 2. Do not proceed with wall panel installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Coordinate metal panels with rain drainage work; flashing; trim; and construction of decks, parapets, walls, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.
- B. Promptly remove protective film, if any, from exposed surfaces of metal panels. Strip with care to avoid damage to finish.
- C. Secondary Structural Supports: Install support framing, bracing, and other secondary structural panel support members and anchorage according to the Light Gage Structural Institute's "Guide Specifications," Section 07410, "Manufactured Roof and Wall Panels."

3.3 PANEL INSTALLATION

- A. General: Comply with panel manufacturer's written instructions and recommendations for installation, as applicable to project conditions and supporting substrates. Anchor panels and other components of the Work securely in place, with provisions for thermal and structural movement.
 - 1. Field cutting exterior panels by torch is not permitted.
 - 2. Horizontal lap joints (endlaps) are not acceptable.
 - 3. Install panels with concealed fasteners, unless otherwise indicated.

4. Install siding/fascia system plumb, straight and true to adjacent work.
 5. Ribs shall be equidistant from corners, gable ends, columns, etc. in accordance with design concept and as shown on the Drawings.
- B. Accessories: Install components required for a complete wall panel assembly including trim, copings, fasciae, ridge closures, clips, seam covers, battens, flashings, gutters, sealants, gaskets, fillers, closure strips, flexible vent flashing and covers, and similar items.
- C. Separate dissimilar metals by painting each metal surface in area of contact with a bituminous coating, by applying rubberized-asphalt underlayment to each metal surface, or by other permanent separation as recommended by manufacturers of dissimilar metals.
- D. Coat back side of metal panels with bituminous coating where it will contact wood, ferrous metal, aluminum or cementitious construction.
- E. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of panel assemblies. Provide types of gaskets, fillers, and sealants indicated or, if not otherwise indicated, types recommended by panel manufacturer.
1. Seal side joints with continuous factory-applied vinyl weather seal.
 2. Prepare joints and apply sealants to comply with requirements of Division 7 Section "Joint Sealants."
- F. Installation Tolerances: Shim and align panel units within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines as indicated and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

3.4 CLEANING AND PROTECTING

- A. Damaged Units: Replace panels and other components of the Work that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.
- B. Cleaning: Remove temporary protective coverings and strippable films, if any, as soon as each panel is installed. On completion of panel installation, clean finished surfaces as recommended by panel manufacturer and maintain in a clean condition during construction.

END OF SECTION

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

SECTION 074633 – VINYL SIDING AND SOFFITS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Vinyl siding, Polymer shake and shingle siding.
- B. Vinyl soffits.
- C. Accessories and trim.

1.2 RELATED SECTIONS

- A. Section 06100 - Framing and Sheathing.
- B. Section 07260 - Vapor Retarders.
- C. Section 07900 - Joint Sealers.

1.3 REFERENCES

- A. ASTM D7793 – Standard Specification for Insulated Vinyl Siding.
- B. ASTM D 3679 - Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Siding.
- C. ASTM D 4477 - Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Soffit.
- D. ASTM D 5206 - Standard Windload Resistance Test.
- E. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- F. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
- G. ASTM D7254 – Standard Specification for Polypropylene (PP) Siding

1.4 DESIGN/PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Code compliance in accordance with one or more the following:
 - 1. IBC and IRC
 - 2. Florida Building Code
 - 3. National Building Code of Canada
 - 4. California Building Code
- B. PVC Fire Resistance: Provide vinyl siding products that meet or exceed the following ratings:
 - 1. Flame Spread Index < 25, per ASTM E 84.
 - 2. Fire endurance classification of 1 hour, per ASTM E 119 in a wall assembly.
- C. Cedar Impressions® Shake and Shingle Siding Fire Resistance: Provide thermoplastic polyolefin siding products that meet or exceed the following ratings:
 - 1. Flame Spread Index <200 per ASTM E-84.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- C. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- D. Verification Samples: For each finish product specified, two samples, minimum size 12 inches (300 mm) long, representing actual product, color, and patterns.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Provide installer with not less than three years of experience with products specified or has obtained 5-Star Green Contractor (Preferred), 5-Star Contractor (preferred), or Master Craftsman credentials from CertainTeed.
- B. Mock-Up: Provide a mock-up for evaluation of installation techniques and workmanship.
 - 1. Finish areas designated by Architect.
 - 2. Do not proceed with remaining work until workmanship and color is approved by Architect.
 - 3. Reinstall mock-up area as required to produce acceptable work.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation. Refer to manufacturer's installation instructions for specific storage and handling requirements.

1.8 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.9 WARRANTY

- A. Provide manufacturer's standard lifetime limited warranty on siding products, transferable to new owners.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: CertainTeed LLC, Siding Products Group, 20 Moores Road, Malvern, Pennsylvania 19355. Tel: (800) 233-8990; Email: gethelp@saint-gobain.com; Web: www.certainteed.com.
- B. Substitutions: See Instructions to Bidders.
- C. Requests for substitutions will be considered in accordance with provisions of Division 1 Section, "Substitutions".

2.2 MATERIALS

- A. Vinyl Siding, Soffit and Components: Provide products made of extruded polyvinyl chloride as specified in this section and manufactured to comply with requirements of ASTM D 3679.
1. Provide elongated nailing slots on nailing flanges to allow for movement.
 2. Factory-notch ends of horizontal panels to form overlapping joints.
 3. Provide products that meet weathering requirements of ASTM D 3679.
- B. American Legend™ D4.5 DL:
1. Design: Double 4.5 inch (114 mm) dutchlap, woodgrain finish with STUDfinder™ Installation System.
 2. Lock: GripLock.
 3. Width: 9 inches (229 mm) plus or minus .062 inch (1.57 mm).
 4. Length: 12 feet 1 inch (3.68 m) plus or minus .025 inch (6 mm).
 5. Average Thickness: 0.042 inch (1.07 mm).
 6. Panel Projection: 9/16 inch (14.3 mm).
 7. Exposure: 4.5 inches (114 mm) with single nailing hem.
 8. Maximum Warp (per 2 panels): 0.250 inch (6 mm).
 9. Color: As selected by Architect from manufacturer's standard color choices.
 10. Color shall be as selected by Architect from the following standard color choices:
 - a. Autumn Red.
 - b. Autumn Yellow.
 - c. Buckskin.
 - d. Charcoal Gray.
 - e. Colonial White.
 - f. Cypress.
 - g. Desert Tan.
 - h. Forest.
 - i. Flagstone.
 - j. Granite Gray.
 - k. Hearthstone.
 - l. Heritage Cream.
 - m. Herringbone.
 - n. Light Maple.
 - o. Natural Clay.
 - p. Oxford Blue.
 - q. Savannah Wicker.
 - r. Seagrass.
 - s. Snow.
 - t. Spruce.
 - u. Sterling Gray.

2.3 VINYL CARPENTRY™ SOFFITS

- A. Universal T4 soffit, solid (non-vented) at gables.
1. Design: Triple 4 inches (102 mm). solid; matte finish.
 2. Width: 12 inches (305 mm) plus or minus .062 inch (1.57 mm).
 3. Length: 12 feet (3.66 m) plus or minus .025 inch (6 mm)
 4. Average Thickness: 0.040 inch (1.0 mm).
 5. Exposure: 4 inches (102 mm) single nailing hem.
 6. Maximum Warp (per 2 panels): 0.250 inch (6 mm).
 7. Color: As selected by Architect from manufacturer's standard color choices.
 8. Color shall be as selected by Architect from the following standard color choices:
 - a. Autumn Red.
 - b. Black(*For soffit use only).
 - c. Brownstone.

- d. Buckskin.
- e. Castle Stone.
- f. Charcoal Gray.
- g. Colonial White.
- h. Cypress.
- i. Desert Tan.
- j. Espresso.
- k. Flagstone.
- l. Forest.
- m. Granite Gray.
- n. Hearthstone.
- o. Heritage Cream.
- p. Herringbone.
- q. Light Maple.
- r. Melrose.
- s. Midnight Blue.
- t. Musket Brown(*For soffit use only).
- u. Natural Clay.
- v. Oxford Blue.
- w. Pacific Blue.
- x. Sable Brown.
- y. Sandstone Beige.
- z. Savannah Wicker.
- aa. Slate.
- bb. Snow.
- cc. Sterling Gray.

- B. Universal T4 soffit, fully vented at eaves and porches.
- 1. Design: Triple 4 inches (102 mm); fully vented, matte finish.
 - 2. Width: 12 inches (305 mm) plus or minus .062 inch (1.57 mm).
 - 3. Length: 12 feet (3.66 m) plus or minus .025 inch (6 mm).
 - 4. Average Thickness: 0.040 inch (1.0 mm).
 - 5. Exposure: 4 inches (102 mm) single nailing hem.
 - 6. Maximum Warp (per 2 panels): 0.250 inch (6 mm).
 - 7. Ventilation: 5.85 sq. inches per sq. ft.
 - 8. Color: As selected by Architect from manufacturer's standard color choices.
 - 9. Color shall be as selected by Architect from the following standard color choices:
 - a. Autumn Red.
 - b. Black.
 - c. Brownstone.
 - d. Buckskin.
 - e. Castle Stone.
 - f. Charcoal Gray.
 - g. Colonial White.
 - h. Cypress.
 - i. Desert Tan.
 - j. Espresso.
 - k. Flagstone.
 - l. Forest.
 - m. Granite Gray.
 - n. Hearthstone.
 - o. Heritage Cream.
 - p. Herringbone.
 - q. Light Maple.
 - r. Melrose.
 - s. Midnight Blue.
 - t. Musket Brown.
 - u. Natural Clay.
 - v. Oxford Blue.
 - w. Pacific Blue.
 - x. Sable Brown.
 - y. Sandstone Beige.
 - z. Savannah Wicker.

- aa. Slate.
- bb. Snow.
- cc. Sterling Gray.

C. Soffit Accessories:

1. J-Channel: 3/8 inch (10 mm), 1/2 inch (13 mm), 5/8" (16 mm) and 3/4 inch (19 mm) by 12 feet, 6 inch (3.81 m) length, for vertical and eave applications.
2. F-Channel: 5/8 inch (15.88 mm) and 3/4 inch (19 mm) by 12 feet 6 inches (3.81 m) length.
3. Soffit H-Bar: 3/8 inch (10 mm), 1/2 inch (13 mm) or 3/4 inch (19 mm) by 12 feet, 6 inches (3.81 m) length, for horizontal and eave applications.
4. Color: Match soffit color.

2.4 VINYL CARPENTRY ACCESSORIES

A. Standard Accessories:

1. Corner post: Standard width, 10 feet (3.05 m), 12 feet (3.66 m), and 20 feet (6.10 m) lengths.
2. J-Channel: Standard width, 12 feet, 6 inches (3.81 m) length.
3. Undersill trim: 3/4" face, 12 feet, 6 inch (3.81 m) length.
4. Dual undersill trim: 3/4" face, 12 feet 6 inches (3.81 m) length.
5. 2-1/2 inch (64 mm) Metal Starter Strip. (No Color)
6. 2-1/4 inch (57 mm) Vinyl Starter Strip. (No Color)
7. Color: As selected by Architect from manufacturer's standard color choices.

2.5 FASTENERS

- A. A. Provide galvanized or other corrosion-resistant nails as recommended by manufacturer of siding products.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Examine, clean, and repair as necessary any substrate conditions which would be detrimental to proper installation.
- B. Do not begin installation until unacceptable conditions have been corrected.

3.3 INSTALLATION

- A. Install products in accordance with the latest printed instructions of the manufacturer.
- B. Installer should have current 5-Star Contractor (preferred) or Master Craftsman credentials.
- C. Install products with all components true and plumb.
- D. For Vinyl Siding: Nail horizontal panels by placing nail in center of slot. Nail vertical panels by placing first nail at top of top slot and remaining nails in center of slots. Drive nails

- straight, leaving 1/16 inch (1.6 mm) space between nail head and flange of panel. (NOTE: Refer to 04-03-1099-US Installation Manual for latest installation recommendations) *For*
- E. Allow space between both ends of siding panels and trim for thermal movement. Overlap horizontal panel ends one-half the width of factory pre-cut notches.
 - F. Stagger lap joints in horizontal siding in uniform pattern as successive courses of siding are installed.
 - G. Install J-channel and flashing to accommodate successive courses of vertical siding. Install wood shims at building corners to bring cut edges of vertical siding out to correct plane.

3.4 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

3.5 CLEANING

- A. At completion of work, remove debris caused by siding installation from project site.

END OF SECTION

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

SECTION 076200 - FLASHING AND SHEET METAL

PART 1 - GENERAL

A. RELATED DOCUMENTS

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. SUMMARY

1. This Section includes flashing and sheet metal in the following categories:
 - a. Exposed trim, gravel stops, drip edge and fasciae.
 - b. Metal flashing and counterflashing.
 - c. Flexible membrane flashing.
 - d. Reglets.
 - e. Gutters and downspouts

PART II

1. Related Sections: The following Sections contain requirements that relate to this Section:
 - a. Division 4 Sections for through-wall flashing and other integral masonry flashings specified as part of masonry work.
 - b. Division 5 Section "Expansion Joint Cover Assemblies" for metal expansion-joint covers.
 - c. Division 7 Section "Roof Accessories" for set-on-type curbs, equipment supports, roof hatches, vents, and other manufactured roof accessory units.
 - d. Division 7 Section "Joint Sealants" for elastomeric sealants.
 - e. Division 7 Roofing Sections for flashing and roofing accessories installed integral with roofing membrane as part of roofing-system work.

B. PERFORMANCE REQUIREMENTS

1. General: Install sheet metal flashing and trim to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing.
2. Fabricate and install flashings at roof edges to comply with recommendations of FM Loss Prevention Data Sheet 1-90 for the following wind zone:
 - a. Wind Zone 2 (perimeter): Wind pressure of 72.6 psf., unless otherwise indicated.
 - b. Wind Zone 3 (corners): Wind pressure of 98.9 psf., unless otherwise indicated.

C. SUBMITTALS

1. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
2. Product Data including manufacturer's material and finish data, installation instructions, and general recommendations for each specified flashing material and fabricated product.
3. Shop Drawings of each item specified showing layout, profiles, methods of joining, and anchorage details.

4. Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

D. QUALITY ASSURANCE

1. Installer Qualifications: Engage an experience Installer who has completed sheet metal flashing and trim work similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

E. PROJECT CONDITIONS

1. Coordinate Work of this Section with interfacing and adjoining Work for proper sequencing of each installation. Ensure best possible weather resistance, durability of Work, and protection of materials and finishes.

PART III - PRODUCTS

A. METALS

1. Stainless-Steel Sheet: ASTM A 167, Type 304, soft annealed, with No. 2D finish, except where harder temper is required for forming or performance; minimum 0.0187 inch (0.5 mm) thick, unless otherwise indicated.
2. Coil-Coated Galvanized Steel Sheet: Zinc-coated, commercial-quality steel sheet conforming to ASTM A 755, G 90 (ASTM A 755M, Z 275) coating designation, coil coated with high-performance fluoropolymer coating as specified in "Coil-Coated Galvanized Steel Sheet Finish" Article; not less than 0.025 inch (0.63 mm) thick (24 gauge) unless otherwise indicated.

B. CONCEALED THROUGH-WALL SHEET METAL FLASHING

1. Material: Fabricate from the following metal:
 - a. Stainless Steel: 0.015 inch (0.4 mm) thick.
 - b. Fabricate through-wall metal flashings embedded in masonry as follows:
 - 1) With ribs formed in dovetail pattern at 3-inch (75-mm) intervals along length of flashing to provide a 3-way integral mortar bond and weep-hole drainage.

C. REGLETS

1. General: Units of type, material, and profile indicated, formed to provide secure interlocking of separate reglet and counterflashing pieces and compatible with flashing indicated.
2. Surface-Mounted Type: Provide with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.
3. Stucco Type: Provide with upturned fastening flange and extension leg of length to match thickness of applied finish materials.
4. Concrete Type: Provide temporary closure tape to keep reglet free of concrete materials, special fasteners for attaching reglet to concrete forms, and guides to ensure alignment of reglet section ends.

5. Masonry Type: Provide with offset top flange for embedment in masonry mortar joint.
6. Flexible Flashing Retainer: Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflashing or where Drawings show reglet without metal counterflashing.
7. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of the counterflashing lower edge.
 - a. Material: Stainless steel, 0.0187 inch (0.5 mm) thick.

D. MISCELLANEOUS MATERIALS AND ACCESSORIES

1. Solder: ASTM B 32, Grade Sn50, used with rosin flux.
2. Solder for Stainless Steel: ASTM B 32, Grade Sn60, used with an acid flux of type recommended by stainless-steel sheet manufacturer; use a noncorrosive rosin flux over tinned surfaces.
3. Stainless-Steel Welding Rods: Type recommended by stainless-steel sheet manufacturer for type of metal sheets furnished.
4. Fasteners: Same metal as sheet metal flashing or other noncorrosive metal as recommended by sheet metal manufacturer. Match finish of exposed heads with material being fastened.
5. Asphalt Mastic: SSPC-Paint 12, solvent-type asphalt mastic, nominally free of sulfur and containing no asbestos fibers, compounded for 15-mil (0.4-mm) dry film thickness per coat.
6. Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, nondrying, nonmigrating sealant.
7. Elastomeric Sealant: Generic type recommended by sheet metal manufacturer and fabricator of components being sealed and complying with requirements for joint sealants as specified in Division 7 Section "Joint Sealants."
8. Epoxy Seam Sealer: 2-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior and interior nonmoving joints, including riveted joints.
9. Adhesives: Type recommended by flashing sheet metal manufacturer for waterproof and weather-resistant seaming and adhesive application of flashing sheet metal.
10. Flexible Membrane Flashing: Material: polymer modified bituminous membrane Flashing as follows:
 - a. "W.R.Grace Vycor Ice and Water Shield", or "Dur-O-Wal Dur-O-Barrier flashing, or "Fiberweb Aqua Flash 500", self-adhering, self-sealing polymer modified bituminous membrane integrally bonded on one side to a polyethylene film; 4" wide tape or job-cut strips; minimum thickness: 30 mils.
 - b. Adhesive / joint cement for flexible flashing shall be type as recommended by membrane manufacturer for compatibility with membrane.
 - c. Sealant for seam edges shall be type as recommended by membrane manufacturer for compatibility with membrane.
11. Metal Accessories: Provide sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of Work, matching or compatible with material being installed; noncorrosive; size and thickness required for performance.

12. Gutter Screen: 1/4-inch (6-mm) hardware cloth installed in sheet metal frames. Fabricate screen and frame of same basic material as gutters and downspouts.
13. Roofing Cement: ASTM D 4586, Type I, asbestos free, asphalt based.

E. FABRICATION, GENERAL

1. Sheet Metal Fabrication Standard: Fabricate sheet metal flashing and trim to comply with recommendations of SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of the item indicated.
2. Comply with details shown to fabricate sheet metal flashing and trim that fit substrates and result in waterproof and weather-resistant performance once installed. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
3. Form exposed sheet metal Work that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems.
4. Seams: Fabricate nonmoving seams in sheet metal with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use.
5. Expansion Provisions: Space movement joints at maximum of 10 feet (3 m) with no joints allowed within 24 inches (610 mm) of corner or intersection. Where lapped or bayonet-type expansion provisions in Work cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with mastic sealant (concealed within joints).
6. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.
7. Separate metal from noncompatible metal or corrosive substrates by coating concealed surfaces at locations of contact with asphalt mastic or other permanent separation as recommended by manufacturer.
8. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of sheet metal exposed to public view.
9. Fabricate cleats and attachment devices from same material as sheet metal component being anchored or from compatible, noncorrosive metal recommended by sheet metal manufacturer.
 - a. Size: As recommended by SMACNA manual or sheet metal manufacturer for application but never less than thickness of metal being secured.

F. SHEET METAL FABRICATIONS

1. General: Fabricate sheet metal items in thickness or weight needed to comply with performance requirements but not less than that listed below for each application and metal.
2. Gutters: Fabricate from the following material:
 - a. Coil-Coated Galvanized Steel: 0.025 inch (0.63 mm) thick, 24gauge.
3. Downspouts: Fabricate from the following material:

- a. Coil-Coated Galvanized Steel: 0.025 inch (0.63 mm) thick, 24gauge.
- 4. Exposed Trim, Gravel Stops, Drip Edge, Flashing, Counterflashing and Fasciae: Fabricate from the following material:
 - a. Coil-Coated Galvanized Steel: 0.025 inch (0.63 mm) thick, 24gauge.

G. COIL-COATED GALVANIZED STEEL SHEET FINISH

- 1. High-Performance Organic Coating Finish: Apply the following system by coil-coating process on galvanized steel sheet as recommended by coating manufacturers and applicator.
 - a. Fluoropolymer 2-Coat Coating System: Manufacturer's standard 2-coat, thermocured system composed of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 605.2.
 - 1) Color and Gloss: Premium grade custom color to match Architect's sample.

PART IV - EXECUTION

A. EXAMINATION

- 1. Examine substrates and conditions under which sheet metal flashing and trim are to be installed and verify that Work may properly commence. Do not proceed with installation until unsatisfactory conditions have been corrected.

B. INSTALLATION

- 1. General: Unless otherwise indicated, install sheet metal flashing and trim to comply with performance requirements, manufacturer's installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Anchor units of Work securely in place by methods indicated, providing for thermal expansion of metal units; conceal fasteners where possible, and set units true to line and level as indicated. Install Work with laps, joints, and seams that will be permanently watertight and weatherproof.
- 2. Install exposed sheet metal Work that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
- 3. Roof-Edge Flashings: Secure metal flashings at roof edges according to FM Loss Prevention Data Sheet 1-49 for specified wind zone.
- 4. Expansion Provisions: Provide for thermal expansion of exposed sheet metal Work. Space movement joints at maximum of 10 feet (3 m) with no joints allowed within 24 inches (610 mm) of corner or intersection. Where lapped or bayonet-type expansion provisions in Work cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with mastic sealant (concealed within joints).

5. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Prein edges of sheets to be soldered to a width of 1-1/2 inches (38 mm), except where pretinned surface would show in finished Work.
 - a. Do not solder the following metals:
 - 1) Aluminum.
 - 2) Coil-coated galvanized steel sheet.
 - b. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.
6. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate elastomeric sealant to comply with SMACNA standards. Fill joint with sealant and form metal to completely conceal sealant.
 - a. Use joint adhesive for nonmoving joints specified not to be soldered.
7. Seams: Fabricate nonmoving seams in sheet metal with flat-lock seams. Tin edges to be seamed, form seams, and solder.
8. Separations: Separate metal from noncompatible metal or corrosive substrates by coating concealed surfaces, at locations of contact, with asphalt mastic or other permanent separation as recommended by manufacturer.
9. Install reglets to receive counterflashing according to the following requirements:
 - a. Where reglets are shown in concrete, furnish reglets for installation under Division 3 Section "Cast-in-Place Concrete."
 - b. Where reglets are shown in masonry, furnish reglets for installation under Division 4 Section "Unit Masonry."
10. Counterflashings: Coordinate installation of counterflashings with installation of assemblies to be protected by counterflashing. Install counterflashings in reglets or receivers. Secure in a water-proof manner by means of snap-in installation and sealant, lead wedges and sealant, interlocking folded seam, or blind rivets and sealant. Lap counterflashing joints a minimum of 2 inches (50 mm) and bed with sealant.
11. Roof-Drainage System: Install drainage items fabricated from sheet metal, with straps, adhesives, and anchors recommended by SMACNA's Manual or the item manufacturer, to drain roof in the most efficient manner. Coordinate roof-drain flashing installation with roof-drainage system installation. Coordinate flashing and sheet metal items for steep-sloped roofs with roofing installation.
12. Overhead-Piping Safety Pans: Suspend pans from pipe and install drain line to plumbing waste or drain line.
13. Equipment Support Flashing: Coordinate equipment support flashing installation with roofing and equipment installation. Weld or seal flashing to equipment support member.
14. Roof-Penetration Flashing: Coordinate roof-penetration flashing installation with roofing and installation of items penetrating roof. Install flashing as follows:
 - a. Turn lead flashing down inside vent piping, being careful not to block vent piping with flashing.
 - b. Seal and clamp flashing to pipes penetrating roof, other than lead flashing on vent piping.

15. Provide and install flexible membrane flashing as underlayment under all sheet metal flashing and trim, and at other concealed locations as indicated on Drawings.
 - a. Lap all joints 4 inches minimum and bond sheets together with approved cement applied to both surfaces and cured in accordance with manufacturer's written instructions. Apply pressure to joints from center to edges with roller to force out entrapped air. After bonding of joints, seal all joint edges watertight with continuous bead of sealant of type approved by the manufacturer for compatibility with membrane. Flashing membrane shall lap down over (and up behind) wall sheathing 4" minimum; lapping all joints shingle-fashion to shed water to outside.
 - b. Fabricate and install flexible flashing window sill pans under sheet metal flashing at all window sills:
 - 1) Turn up three sides to form waterproof pan which drains to exterior. Form corners by folding in accordance with manufacturer's instructions, and bond and seal all corners and joints with adhesive and sealant approved by the manufacturer. Cover flexible flashing pan with sheet metal flashing in the form of a waterproof sheet metal pan, with three turned-up sides, which drains to exterior.

C. CLEANING AND PROTECTION

1. Clean exposed metal surfaces, removing substances that might cause corrosion of metal or deterioration of finishes.
2. Provide final protection and maintain conditions that ensure sheet metal flashing and trim Work during construction is without damage or deterioration other than natural weathering at the time of Substantial Completion.

END OF SECTION

DIVISION 7 THERMAL AND MOISTURE PROTECTION
SECTION 078413 - PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Penetrations in fire-resistance-rated walls.
 - 2. Penetrations in horizontal assemblies.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Product Schedule: For each penetration firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing and inspecting agency.
 - 1. Engineering Judgments: Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping system, submit illustration, with modifications marked, approved by penetration firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly. Obtain approval of authorities having jurisdiction prior to submittal.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For each penetration firestopping system, for tests performed by a qualified testing agency.

1.5 CLOSEOUT SUBMITTALS

- A. Installer Certificates: From Installer indicating that penetration firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A firm that has been approved by FM Global according to FM Global 4991, "Approval of Firestop Contractors," or been evaluated by UL and found to comply with its "Qualified Firestop Contractor Program Requirements."

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install penetration firestopping system when ambient or substrate temperatures are outside limits permitted by penetration firestopping system manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.
- B. Install and cure penetration firestopping materials per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.8 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping systems can be installed according to specified firestopping system design.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping systems.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics:
 - 1. Perform penetration firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
 - 2. Test per testing standards referenced in "Penetration Firestopping Systems" Article. Provide rated systems complying with the following requirements:
 - a. Penetration firestopping systems shall bear classification marking of a qualified testing agency.
 - 1) UL in its "Fire Resistance Directory."
 - 2) Intertek Group in its "Directory of Listed Building Products."
 - 3) FM Global in its "Building Materials Approval Guide."

2.2 PENETRATION FIRESTOPPING SYSTEMS

- A. Penetration Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. 3M Fire Protection Products.
 - b. Construction Solutions.
 - c. Hilti, Inc.
 - d. Specified Technologies, Inc.
 - e. Tremco, Inc.

- B. Penetrations in Fire-Resistance-Rated Walls: Penetration firestopping systems with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
 - 1. F-Rating: Not less than the fire-resistance rating of constructions penetrated.
- C. Penetrations in Horizontal Assemblies: Penetration firestopping systems with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
 - 1. F-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated.
 - 2. T-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.
 - 3. W-Rating: Provide penetration firestopping systems showing no evidence of water leakage when tested according to UL 1479.
- D. Penetrations in Smoke Barriers: Penetration firestopping systems with ratings determined per UL 1479, based on testing at a positive pressure differential of 0.30-inch wg.
 - 1. L-Rating: Not exceeding 5.0 cfm/sq. ft. of penetration opening at and no more than 50-cfm cumulative total for any 100 sq. ft. at both ambient and elevated temperatures.
- E. Exposed Penetration Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, per ASTM E 84.
- F. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping system manufacturer and approved by qualified testing and inspecting agency for conditions indicated.
 - 1. Permanent forming/damming/backing materials.
 - 2. Substrate primers.
 - 3. Collars.
 - 4. Steel sleeves.

2.3 FILL MATERIALS

- A. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer sleeve lined with an intumescent strip, a flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
- B. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.
- C. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- D. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced intumescent elastomeric sheet bonded to galvanized-steel sheet.
- E. Intumescent Putties: Nonhardening, water-resistant, intumescent putties containing no solvents or inorganic fibers.

- F. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- G. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.
- H. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.
- I. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
- J. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants.

2.4 MIXING

- A. Penetration Firestopping Materials: For those products requiring mixing before application, comply with penetration firestopping system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Before installing penetration firestopping systems, clean out openings immediately to comply with manufacturer's written instructions and with the following requirements:
 - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping materials.
 - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping materials. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form-release agents from concrete.
- B. Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

3.3 INSTALLATION

- A. General: Install penetration firestopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications.
- B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings.
 - 1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not forming permanent components of firestopping.
- C. Install fill materials by proven techniques to produce the following results:
 - 1. Fill voids and cavities formed by openings, forming materials, accessories and penetrating items to achieve required fire-resistance ratings.
 - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 - 3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

- A. Wall Identification: Permanently label walls containing penetration firestopping systems with the words "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS," using lettering not less than 3 inches high and with minimum 0.375-inch strokes.
 - 1. Locate in accessible concealed floor, floor-ceiling, or attic space at 15 feet from end of wall and at intervals not exceeding 30 feet.

3.5 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping material and install new materials to produce systems complying with specified requirements.

END OF SECTION 078413

DIVISION 7 – THERMAL AND MOISTURE PROTECTION
SECTION 078446 - FIRE-RESISTIVE JOINT SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Joints in or between fire-resistance-rated constructions.
2. Joints in smoke barriers.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Product Schedule: For each fire-resistive joint system. Include location and design designation of qualified testing agency.

1. Where Project conditions require modification to a qualified testing agency's illustration for a particular fire-resistive joint system condition, submit illustration, with modifications marked, approved by fire-resistive joint system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.

C. Qualification Data: For qualified Installer.

D. Installer Certificates: From Installer indicating fire-resistive joint systems have been installed in compliance with requirements and manufacturer's written recommendations.

E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for fire-resistive joint systems.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: A firm experienced in installing fire-resistive joint systems similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful performance. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements. Manufacturer's willingness to sell its fire-resistive joint system products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.

B. Fire-Test-Response Characteristics: Fire-resistive joint systems shall comply with the following requirements:

1. Fire-resistive joint system tests are performed by a qualified testing agency

- acceptable to authorities having jurisdiction.
2. Fire-resistive joint systems are identical to those tested per testing standard referenced in "Fire-Resistive Joint Systems" Article. Provide rated systems complying with the following requirements:
 - a. Fire-resistive joint system products bear classification marking of qualified testing agency.
 - b. Fire-resistive joint systems correspond to those indicated by reference to designations listed by the following:
 - 1) UL in its "Fire Resistance Directory."

1.4 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install fire-resistive joint systems when ambient or substrate temperatures are outside limits permitted by fire-resistive joint system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Install and cure fire-resistive joint systems per manufacturer's written instructions using natural means of ventilation or, where this is inadequate, forced-air circulation.

1.5 COORDINATION

- A. Coordinate construction of joints to ensure that fire-resistive joint systems are installed according to specified requirements.
- B. Coordinate sizing of joints to accommodate fire-resistive joint systems.

PART 2 - PRODUCTS

2.1 FIRE-RESISTIVE JOINT SYSTEMS

- A. Where required, provide fire-resistive joint systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assemblies in or between which fire-resistive joint systems are installed. Fire-resistive joint systems shall accommodate building movements without impairing their ability to resist the passage of fire and hot gases.
- B. Joints in or between Fire-Resistance-Rated Construction: Provide fire-resistive joint systems with ratings determined per ASTM E 1966 or UL 2079:
 1. Joints include those installed in or between fire-resistance-rated walls floor or floor/ceiling assemblies and roofs or roof/ceiling assemblies.
 2. Fire-Resistance Rating: Equal to or exceeding the fire-resistance rating of construction they will join.
 3. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include,

but are not limited to, the following:

- a. 3M Fire Protection Products.
 - b. A/D Fire Protection Systems Inc.
 - c. Hilti, Inc.
 - d. Specified Technologies Inc.
 - e. Tremco, Inc.; Tremco Fire Protection Systems Group.
- C. Joints in Smoke Barriers: Provide fire-resistive joint systems with ratings determined per UL 2079.
1. L-Rating: Not exceeding **5.0 cfm/ft (0.00775 cu. m/s x m)** of joint at **0.30 inch wg (74.7 Pa)** at both ambient and elevated temperatures.
- D. Exposed Fire-Resistive Joint Systems: Provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.
- E. VOC Content: Provide fire-resistive joint systems that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
1. Architectural Sealants: 250 g/L.
 2. Sealant Primers for Nonporous Substrates: 250 g/L.
 3. Sealant Primers for Porous Substrates: 775 g/L.
- F. Accessories: Provide components of fire-resistive joint systems, including primers and forming materials that are needed to install fill materials and to maintain ratings required. Use only components specified by fire-resistive joint system manufacturer and approved by the qualified testing agency for systems indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for joint configurations, substrates, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Clean joints immediately before installing fire-resistive joint systems to comply with fire-resistive joint system manufacturer's written instructions and the following requirements:
 1. Remove from surfaces of joint substrates foreign materials that could interfere with adhesion of fill materials.
 2. Clean joint substrates to produce clean, sound surfaces capable of developing

optimum bond with fill materials. Remove loose particles remaining from cleaning operation.

3. Remove laitance and form-release agents from concrete.

- B. Priming: Prime substrates where recommended in writing by fire-resistive joint system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent fill materials of fire-resistive joint system from contacting adjoining surfaces that will remain exposed on completion of the Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove stains. Remove tape as soon as possible without disturbing fire-resistive joint system's seal with substrates.

3.3 INSTALLATION

- A. General: Install fire-resistive joint systems to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming materials and other accessories of types required to support fill materials during their application and in position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
 - 1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of fire-resistive joint system.
- C. Install fill materials for fire-resistive joint systems by proven techniques to produce the following results:
 - 1. Fill voids and cavities formed by joints and forming materials as required to achieve fire-resistance ratings indicated.
 - 2. Apply fill materials so they contact and adhere to substrates formed by joints.
 - 3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

- A. Identify fire-resistive joint systems with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within **6 inches (150 mm)** of joint edge so labels will be visible to anyone seeking to remove or penetrate joint system. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
 - 1. The words "Warning - Fire-Resistive Joint System - Do Not Disturb. Notify Building Management of Any Damage."
 - 2. Contractor's name, address, and phone number.
 - 3. Designation of applicable testing agency.

4. Date of installation.
5. Manufacturer's name.
6. Installer's name.

3.5 FIELD QUALITY CONTROL

- A. Where deficiencies are found or fire-resistive joint systems are damaged or removed due to testing, repair or replace fire-resistive joint systems so they comply with requirements.

3.6 CLEANING AND PROTECTING

- A. Clean off excess fill materials adjacent to joints as the Work progresses by methods and with cleaning materials that are approved in writing by fire-resistive joint system manufacturers and that do not damage materials in which joints occur.
- B. Provide final protection and maintain conditions during and after installation that ensure fire-resistive joint systems are without damage or deterioration at time of Substantial Completion. If damage or deterioration occurs despite such protection, cut out and remove damaged or deteriorated fire-resistive joint systems immediately and install new materials to produce fire-resistive joint systems complying with specified requirements.

3.7 FIRE-RESISTIVE JOINT SYSTEM SCHEDULE

- A. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance Directory" under product Category XHBN or Category XHDG.
- B. See drawings for fire/smoke resistance required for various assemblies. Provide fire/smoke joint system required and listed in referenced fire resistance directories as applicable. Provide joint systems that accommodate anticipated movement joint movement

END OF SECTION 078446

DIVISION 7 – THERMAL AND MOISTURE PROTECTION
SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Silicone joint sealants.
 - 2. Nonstaining silicone joint sealants.
 - 3. Urethane joint sealants.
 - 4. Mildew-resistant joint sealants.
 - 5. Latex joint sealants.
- B. Related Requirements:
 - 1. Section 079219 "Acoustical Joint Sealants" for sealing joints in sound-rated construction.
 - 2. Section 321373 "Concrete Paving Joint Sealants" for sealing joints in paved roads, parking lots, walkways, and curbing.

1.3 ACTION SUBMITTALS

- A. Product Data: For each joint-sealant product.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each kind of joint sealant, for tests performed by manufacturer and witnessed by a qualified testing agency.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications:
 - 1. Engage an experienced Installer who has completed joint sealant applications similar in material, design, and extent to that indicated for Project that have resulted in construction with a record of successful in-service performance.
- B. Single Source Responsibility for Joint Sealant Materials: Obtain joint sealant materials from a single manufacturer for each different product required.

1.6 FIELD CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
 - 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
 - 2. When joint substrates are wet.
 - 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
 - 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 SILICONE JOINT SEALANTS

- A. Silicone, S, NS, 35, NT: Single-component, nonsag, plus 35 percent and minus 35 percent movement capability. nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 35, Use NT.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Dow Corning Corporation.
 - b. GE Construction Sealants; Momenive Performance Materials Inc.

2.3 NONSTAINING SILICONE JOINT SEALANTS

- A. Nonstaining Joint Sealants: No staining of substrates when tested according to ASTM C 1248.
- B. Silicone, Nonstaining, S, NS, 50, NT: Nonstaining, single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Use NT.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Dow Corning Corporation.
 - b. GE Construction Sealants; Momenive Performance Materials Inc.
 - c. Pecora Corporation.
 - d. Tremco Incorporated.

2.4 URETHANE JOINT SEALANTS

- A. Urethane, S, NS, 25, NT: Single-component, nonsag, nontraffic-use, plus 25 percent and minus 25 percent movement capability, urethane joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Pecora Corporation.
 - b. Sika Corporation; Joint Sealants.
 - c. Tremco Incorporated.

2.5 MILDEW-RESISTANT JOINT SEALANTS

- A. Mildew-Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.
- B. Silicone, Mildew Resistant, Acid Curing, S, NS, 25, NT: Mildew-resistant, single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Dow Corning Corporation.
 - b. GE Construction Sealants; Momentive Performance Materials Inc.
 - c. Pecora Corporation.
 - d. Tremco Incorporated.

2.6 LATEX JOINT SEALANTS

- A. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Pecora Corporation.
 - b. Sherwin-Williams Company (The).
 - c. Tremco Incorporated.

2.7 JOINT-SEALANT BACKING

- A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. BASF Corp. - Construction Chemicals.
 - b. Construction Foam Products; a division of Nomaco, Inc.

- B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin) Type O (open-cell material) Type B (bicellular material with a surface skin) or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

2.8 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 - 2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
 - a. Concrete.
 - b. Masonry.
 - c. Unglazed surfaces of ceramic tile.
 - 3. Remove laitance and form-release agents from concrete.
 - 4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint

sealants. Nonporous joint substrates include the following:

- a. Metal.
 - b. Glass.
 - c. Porcelain enamel.
 - d. Glazed surfaces of ceramic tile.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
- 1. Do not leave gaps between ends of sealant backings.
 - 2. Do not stretch, twist, puncture, or tear sealant backings.
 - 3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
- 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
- 1. Remove excess sealant from surfaces adjacent to joints.
 - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - 3. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.

4. Provide flush joint profile at according to Figure 8B in ASTM C 1193.
5. Provide recessed joint configuration of recess depth and at according to Figure 8C in ASTM C 1193.
 - a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

3.4 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.6 JOINT-SEALANT SCHEDULE

- A. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.
 1. Joint Locations:
 - a. Control and expansion joints in unit masonry.
 - b. Joints between metal panels.
 - c. Joints between different materials listed above.
 - d. Perimeter joints between materials listed above and frames of doors windows and louvers.
 - e. Control and expansion joints in ceilings and other overhead surfaces.
 - f. Joint Sealant: Silicone, nonstaining, S, NS, 50, NT.
 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- B. Joint-Sealant Application-1: Interior joints in vertical surfaces and horizontal nontraffic surfaces.
 1. Joint Locations:
 - a. Control and expansion joints on exposed interior surfaces of exterior walls.
 - b. Tile control and expansion joints.
 - c. Joint Sealant: Urethane, S, NS, 25, NT.
 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- C. Joint-Sealant Application-2: Interior joints in vertical surfaces and horizontal nontraffic surfaces not subject to significant movement.
 1. Joint Locations:
 - a. Control joints on exposed interior surfaces of exterior walls.

- b. Perimeter joints between interior wall surfaces and frames of interior doors windows and elevator entrances.
 - 2. Joint Sealant: Acrylic latex.
 - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- D. Joint-Sealant Application-3: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.
 - 1. Joint Locations:
 - a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
 - b. Tile control and expansion joints where indicated.
 - 2. Joint Sealant: Silicone, mildew resistant, acid curing, S, NS, 25, NT.
 - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- E. Joint-Sealant Application-4: Concealed mastics.
 - 1. Joint Locations:
 - a. Aluminum thresholds.
 - b. Sill plates.
 - 2. Joint Sealant: Butyl-rubber based.
 - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

END OF SECTION 079200

DIVISION 7 – THERMAL AND MOISTURE PROTECTION
SECTION 079219 - ACOUSTICAL JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes acoustical joint sealants.
- B. Related Requirements:
 - 1. Section 079200 "Joint Sealants" for elastomeric, latex, and butyl-rubber-based joint sealants for nonacoustical applications.

1.3 ACTION SUBMITTALS

- A. Product Data: For each acoustical joint sealant.
- B. Acoustical-Joint-Sealant Schedule: Include the following information:
 - 1. Joint-sealant application, joint location, and designation.
 - 2. Joint-sealant manufacturer and product name.
 - 3. Joint-sealant formulation.
 - 4. Joint-sealant color.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each kind of acoustical joint sealant, for tests performed by manufacturer and witnessed by a qualified testing agency.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Provide acoustical joint-sealant products that effectively reduce airborne sound transmission through perimeter joints and openings in building construction, as demonstrated by testing representative assemblies according to ASTM E 90.

2.2 ACOUSTICAL JOINT SEALANTS

- A. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex acoustical sealant complying with ASTM C 834.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. GE Construction Sealants; Momentive Performance Materials Inc.
 - b. USG Corporation.
 2. Colors of Exposed Acoustical Joint Sealants: As selected by Architect from manufacturer's full range of colors.
- B. Acoustical Sealant for Concealed Joints: Manufacturer's standard nonsag, nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber acoustical sealant.
1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Pecora Corporation.
 - b. Tremco Incorporated
 - c. USG Corporation

2.3 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by acoustical-joint-sealant manufacturer where required for adhesion of sealant to joint substrates.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive acoustical joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing acoustical joint sealants to comply with joint-sealant manufacturer's written instructions.
- B. Joint Priming: Prime joint substrates where recommended by acoustical-joint-sealant manufacturer. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after

tooling without disturbing joint seal.

3.3 INSTALLATION OF ACOUSTICAL JOINT SEALANTS

- A. Comply with acoustical joint-sealant manufacturer's written installation instructions unless more stringent requirements apply.
- B. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical joint sealant. Install acoustical joint sealants at both faces of partitions, at perimeters, and through penetrations. Comply with ASTM C 919, ASTM C 1193, and manufacturer's written recommendations for closing off sound-flanking paths around or through assemblies, including sealing partitions to underside of floor slabs above acoustical ceilings.

3.4 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of acoustical joint sealants and of products in which joints occur.

3.5 PROTECTION

- A. Protect acoustical joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated acoustical joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 079219

DIVISION 8 - OPENINGS
SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior standard steel doors and frames.
2. Exterior standard steel doors and frames.

B. Related Requirements:

1. Section 087100 "Door Hardware" for door hardware for hollow-metal doors.

1.2 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings in accordance with NAAMM-HMMA 803 or ANSI/SDI A250.8.

1.3 COORDINATION

- A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.
- B. Coordinate requirements for installation of door hardware, electrified door hardware, and access control and security systems.

1.4 ACTION SUBMITTALS

A. Product Data:

1. Interior standard steel doors and frames.
2. Exterior standard steel doors and frames.

B. Product Data Submittals: For each product.

1. Include construction details, material descriptions, core descriptions, fire-resistance ratings, temperature-rise ratings, and finishes.

C. Shop Drawings: Include the following:

1. Elevations of each door type.
2. Details of doors, including vertical- and horizontal-edge details and metal

- thicknesses.
 - 3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
 - 4. Locations of reinforcement and preparations for hardware.
 - 5. Details of each different wall opening condition.
 - 6. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
 - 7. Details of anchorages, joints, field splices, and connections.
 - 8. Details of accessories.
 - 9. Details of molding, removable stops, and glazing.
- D. Product Schedule: For hollow metal doors and frames, prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final door hardware schedule.

1.5 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each type of fire-rated hollow-metal door and frame assembly for tests performed by a qualified testing agency indicating compliance with performance requirements.

1.6 CLOSEOUT SUBMITTALS

- A. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow-metal doors and frames palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
- 1. Provide additional protection to prevent damage to factory-finished units.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow-metal doors and frames vertically under cover at Project site with head up. Place on minimum **4-inch**- high wood blocking. Provide minimum **1/4-inch** space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 HOLLOW METAL DOORS AND FRAMES

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. **Ceco Door; AADG, Inc.; ASSA ABLOY**
2. **Custom Metal Products**
3. **Mesker Door; Mesker Openings Group**
4. **National Custom Hollow Metal Doors & Frames**
5. **North American Door Corp**
6. **Pioneer Industries; AADG, Inc.; ASSA ABLOY**
7. **Premier Products, Inc**
8. **Republic Doors and Frames; a Allegion brand**
9. **Security Metal Products; a brand of ASSA ABLOY**
10. **Steelcraft; Allegion plc**

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings and temperature-rise limits indicated on Drawings, based on testing at positive pressure in accordance with NFPA 252 or UL 10C.
1. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing in accordance with UL 1784 and installed in compliance with NFPA 105.
 2. Temperature-Rise Limit: At vertical exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than **450 deg F** above ambient after 30 minutes of standard fire-test exposure.
- B. Fire-Rated, Borrowed-Lite Assemblies: Assemblies complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing in accordance with NFPA 257 or UL 9.
- C. Thermally Rated Door Assemblies: Provide door assemblies with U-factor of not more than **0.40 deg Btu/F x h x sq. ft.** when tested in accordance with ASTM C1363 or ASTM E1423.

2.3 INTERIOR STANDARD STEEL DOORS AND FRAMES

- A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 2; ANSI/SDI A250.4, Level B. Interior Doors and Frames.
1. Doors:
 - a. Type: As indicated in the Door and Frame Schedule on Drawings.
 - b. Thickness: **1-3/4 inches**.
 - c. Face: Uncoated steel sheet, minimum thickness of **0.042 inch**.

- d. Edge Construction: Model 1, Full Flush.
 - e. Edge Bevel: Provide manufacturer's standard beveled or square edges.
 - f. Core: Manufacturer's standard.
 - g. Fire-Rated Core: Manufacturer's standard laminated mineral board core for fire-rated and temperature-rise-rated doors.
2. Frames:
- a. Materials: Uncoated steel sheet, minimum thickness of **0.053 inch**.
 - b. Sidelite and Transom Frames: Fabricated from same thickness material as adjacent door frame.
 - c. Construction: Full profile welded.
3. Exposed Finish: Prime.

2.4 EXTERIOR STANDARD STEEL DOORS AND FRAMES

- A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Extra-Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 3; ANSI/SDI A250.4, Level A. Exterior Doors and Frames.
1. Doors:
- a. Type: As indicated in the Door and Frame Schedule on Drawings.
 - b. Thickness: **1-3/4 inches**.
 - c. Face: Metallic-coated steel sheet, minimum thickness of **0.053 inch**, with minimum **A60** coating.
 - d. Edge Construction: Model 2, Seamless.
 - e. Edge Bevel: Provide manufacturer's standard beveled or square edges.
 - f. Top Edge Closures: Close top edges of doors with flush closures of same material as face sheets. Seal joints against water penetration.
 - g. Bottom Edges: Close bottom edges of doors where required for attachment of weather stripping with end closures or channels of same material as face sheets. Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape.
 - h. Core: Polyisocyanurate, Vertical steel stiffener.
 - i. Fire-Rated Core: Manufacturer's standard vertical steel stiffener with insulation core for fire-rated doors.
2. Frames:
- a. Materials: Metallic-coated steel sheet, minimum thickness of **0.053 inch**, with minimum **A60** coating.
 - b. Construction: Full profile welded.
3. Exposed Finish: Prime.

2.5 BORROWED LITES

- A. Fabricate of uncoated steel sheet, minimum thickness of **0.053 inch**.
- B. Construction: Full profile welded.
- C. Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as metal as frames.
- D. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.

2.6 HOLLOW-METAL PANELS

- A. Provide hollow-metal panels of same materials, construction, and finish as adjacent door assemblies.

2.7 FRAME ANCHORS

- A. Jamb Anchors:
 - 1. Type: Anchors of minimum size and type required by applicable door and frame standard, and suitable for performance level indicated.
 - 2. Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each **24 inches** of frame height above **7 feet**.
 - 3. Postinstalled Expansion Anchor: Minimum **3/8-inch**- diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.
- B. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor.
- C. Floor Anchors for Concrete Slabs with Underlayment: Adjustable-type anchors with extension clips, allowing not less than **2-inch** height adjustment. Terminate bottom of frames at top of underlayment.
- D. Material: ASTM A879/A879M, Commercial Steel (CS), **04Z** coating designation; mill phosphatized.
 - 1. For anchors built into exterior walls, steel sheet complying with ASTM A1008/A1008M or ASTM A1011/A1011M; hot-dip galvanized in accordance with ASTM A153/A153M, Class B.

2.8 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

- B. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C. Metallic-Coated Steel Sheet: ASTM A653/A653M, Commercial Steel (CS), Type B.
- D. Inserts, Bolts, and Fasteners: Hot-dip galvanized in accordance with ASTM A153/A153M.
- E. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.
- F. Mineral-Fiber Insulation: ASTM C665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E136 for combustion characteristics.
- G. Glazing: Comply with requirements in Section 088000 "Glazing."

2.9 FABRICATION

- A. Door Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum **3/4 inch** beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.
- B. Hollow-Metal Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.
 - 1. Sidelite and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by welding.
 - 2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
 - 3. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
 - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
 - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
 - 4. Terminated Stops (Hospital Stops): Terminate stops **6 inches** above finish floor with a 45-degree angle cut, and close open end of stop with steel sheet closure. Cover opening in extension of frame with welded-steel filler plate, with welds ground smooth and flush with frame.
- C. Hardware Preparation: Factory prepare hollow-metal doors and frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping in accordance with ANSI/SDI A250.6, the Door

Hardware Schedule on Drawings, and templates.

1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
 2. Comply with BHMA A156.115 for preparing hollow-metal doors and frames for hardware.
- D. Glazed Lites: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted, or, mitered hairline joints.
1. Provide stops and moldings flush with face of door, and with square stops unless otherwise indicated.
 2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
 3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames. Provide loose stops and moldings on inside of hollow-metal doors and frames.
 4. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.
 5. Provide stops for installation with countersunk flat- or oval-head machine screws spaced uniformly not more than **9 inches** o.c. and not more than **2 inches** o.c. from each corner.

2.10 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

2.11 LOUVERS

- A. Provide louvers for interior doors, where indicated, which comply with SDI 111, with blades or baffles formed of **0.020-inch-** thick, cold-rolled steel sheet set into **0.032-inch-** thick steel frame.
1. Sightproof Louver: Stationary louvers constructed with inverted-V or inverted-Y blades.
 2. Lightproof Louver: Stationary louvers constructed with baffles to prevent light from passing from one side to the other.
 3. Fire-Rated Automatic Louvers: Louvers constructed with movable blades closed by actuating fusible link, and listed and labeled for use in fire-rated door assemblies of type and fire-resistance rating indicated by same qualified testing and inspecting agency that established fire-resistance rating of door assembly.
- B. Form corners of moldings with hairline joints. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces. Touch up factory-applied finishes where spreaders are removed.
- B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.2 INSTALLATION

- A. Install hollow-metal doors and frames plumb, rigid, properly aligned, and securely fastened in place. Comply with approved Shop Drawings and with manufacturer's written instructions.
- B. Hollow-Metal Frames: Comply with ANSI/SDI A250.11.
 - 1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces without damage to completed Work.
 - a. Where frames are fabricated in sections, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces. Touch-up finishes.
 - b. Install frames with removable stops located on secure side of opening.
 - 2. Fire-Rated Openings: Install frames in accordance with NFPA 80.
 - 3. Floor Anchors: Secure with post installed expansion anchors.
 - a. Floor anchors may be set with power-actuated fasteners instead of post installed expansion anchors if so indicated and approved on Shop Drawings.
 - 4. Solidly pack mineral-fiber insulation inside frames.
 - 5. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout or mortar.
 - 6. In-Place Concrete or Masonry Construction: Secure frames in place with post installed expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
 - 7. Installation Tolerances: Adjust hollow-metal frames to the following tolerances:
 - a. Squareness: Plus or minus **1/16 inch**, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus **1/16 inch**, measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus **1/16 inch**, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus **1/16 inch**, measured at jambs at floor.

- C. Hollow-Metal Doors: Fit and adjust hollow-metal doors accurately in frames, within clearances specified below.
 - 1. Non-Fire-Rated Steel Doors: Comply with ANSI/SDI A250.8.
 - 2. Fire-Rated Doors: Install doors with clearances in accordance with NFPA 80.
 - 3. Smoke-Control Doors: Install doors in accordance with NFPA 105.
- D. Glazing: Comply with installation requirements in Section 088000 "Glazing" and with hollow-metal manufacturer's written instructions.

3.3 REPAIR

- A. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- B. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint in accordance with manufacturer's written instructions.
- C. Factory-Finish Touchup: Clean abraded areas and repair with same material used for factory finish in accordance with manufacturer's written instructions.
- D. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION 081113

DIVISION 8 OPENINGS

SECTION 081416 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Solid-core flush wood doors with plastic-laminate-faces.
2. Light frames and louvers.

B. Related Requirements:

1. Section 088000 "Glazing" for glass view panels in flush wood doors.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Solid-core flush wood doors with plastic-laminate-faces.
2. Light frames and louvers.

B. Product Data Submittals: For each product, including the following:

1. Door core materials and construction.
2. Door edge construction
3. Door face type and characteristics.
4. Door louvers.
5. Door trim for openings.
6. Door frame construction.
7. Factory-machining criteria.

C. Shop Drawings: Indicate location, size, and hand of each door; elevation of each type of door; construction details not covered in Product Data; and the following:

1. Door schedule indicating door location, type, size, fire protection rating, and swing.
2. Door elevations, dimension and locations of hardware, lite and louver cutouts, and glazing thicknesses.
3. Details of frame for each frame type, including dimensions and profile.
4. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
5. Dimensions and locations of blocking for hardware attachment.
6. Dimensions and locations of mortises and holes for hardware.
7. Clearances and undercuts.

D. Samples for Initial Selection: For plastic-laminate door faces.

E. Samples for Verification:

1. Plastic laminate, 6 inches (150 mm) square, for each color, texture, and pattern selected.
2. Corner sections of doors, approximately 8 by 10 inches (200 by 250 mm), with door faces and edges representing actual materials to be used.
3. Louver blade and frame sections, 6 inches (150 mm) long, for each material and finish specified.
4. Frames for light openings, 6 inches (150 mm) long, for each material, type, and finish required.

1.3 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For special warranty.

1.4 CLOSEOUT SUBMITTALS

- A. Special warranties.
- B. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

1.5 QUALITY ASSURANCE

- A. Manufacturer's Certification: Licensed participant in AWI's Quality Certification Program.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in cardboard cartons, and wrap bundles of doors in plastic sheeting.
- C. Mark each door on bottom rail with opening number used on Shop Drawings.

1.7 FIELD CONDITIONS

- A. Environmental Limitations:
1. Do not deliver or install doors until building is enclosed and weathertight, wet work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F (16 and 32 deg C) and relative humidity between 43 and 70 percent during remainder of construction period.

1.8 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
1. Failures include, but are not limited to, the following:
 - a. Delamination of veneer.
 - b. Warping (bow, cup, or twist) more than **1/4 inch (6.4 mm)** in a **42-by-84-inch (1067-by-2134-mm)** section.
 - c. Telegraphing of core construction in face veneers exceeding **0.01 inch in a 3-inch (0.25 mm in a 76.2-mm)** span.
 2. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Wood Door and Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings and temperature-rise limits indicated on Drawings, based on testing at positive pressure in accordance with UL 10C or NFPA 252.
1. Temperature-Rise Limit: At vertical exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than **450 deg F (250 deg C)** above ambient after 30 minutes of standard fire-test exposure.
- B. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing in accordance with UL 1784 and installed in compliance with NFPA 105.

2.2 FLUSH WOOD DOORS, GENERAL

- A. Quality Standard: In addition to requirements specified, comply with AWI/AWMAC/WI's "Architectural Woodwork Standards."
1. Provide labels and certificates from AWI certification program indicating that doors comply with requirements of grades specified.
- B. Composite Wood Products: Formaldehyde emission rates shall not be greater than the following when tested according to ASTM D6007 or ASTM E1333:
1. Hardwood Plywood: 0.05 ppm.
 2. Particleboard: 0.09 ppm.
 3. MDF More Than **5/16 Inch (8 mm)** Thick: 0.11 ppm.
 4. MDF **5/16 Inch (8 mm)** or Less in Thickness: 0.13 ppm.

- C. Composite Wood Products: Products shall be made without urea formaldehyde.

2.3 SOLID-CORE FLUSH WOOD DOORS AND TRANSOM PANELS WITH PLASTIC-LAMINATE FACES

A. Interior Doors, Solid Core with Plastic-Laminate Faces :

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. ABS- American Building Supply- Doormerica
 - b. Oshkosh Door Company
 - c. VT Industries, Inc.
2. ANSI/WDMA I.S. 1A Quality Grade: Custom.
3. Architectural Woodwork Standards Quality Grade: [Premium][Custom].
4. Plastic-Laminate Faces: High-pressure decorative laminates complying with ISO 4586-3, Grade HGS.
5. Colors, Patterns, and Finishes: As selected by Architect from laminate manufacturer's full range of products.
6. Exposed Vertical and Top Edges: Plastic laminate that matches faces, applied before faces.
 - a. Fire-Rated Single Doors: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed vertical edges.
 - b. Fire-Rated Pairs of Doors:
 - 1) Provide formed-steel edges and astragals with intumescent seals.
 - a) Finish steel edges and astragals with baked enamel.
 - c. Mineral-Core Doors: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.
 - 1) Screw-Holding Capability: **475 lbf (2110 N)** in accordance with WDMA T.M. 10.
7. Core for Non-Fire-Rated Doors:
 - a. ANSI A208.1, Grade LD-2 particleboard.
 - 1) Blocking: Provide wood blocking in particleboard-core doors as follows:
 - a) **5-inch (125-mm)** top-rail blocking, in doors indicated to have closers.

- b) 5-inch (125-mm) bottom-rail blocking, in exterior doors and doors indicated to have kick, mop, or armor plates.
 - c) 5-inch (125-mm) midrail blocking, in doors indicated to have exit devices.
 - 2) Provide doors with glued-wood-stave or WDMA I.S. 10 structural-composite-lumber cores instead of particleboard cores for doors scheduled to receive exit devices in Section 087100 "Door Hardware."
 - 3) Screw Withdrawal, Door Face: 475 lbf (2110 N).
 - 4) Screw Withdrawal, Vertical Door Edge: 475 lbf (2110 N).
 - b. Either glued wood stave or WDMA I.S. 10 structural composite lumber.
8. Core for Fire-Rated Doors: As required to achieve fire-protection rating indicated on Drawings.
- a. Blocking for Mineral-Core Doors: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated on Drawings as follows:
 - 1) 5-inch (125-mm) top-rail blocking.
 - 2) 5-inch (125-mm) bottom-rail blocking, in doors indicated to have protection plates.
 - 3) 5-inch (125-mm) midrail blocking, in doors indicated to have armor plates.
 - 4) [4-1/2-by-10-inch (114-by-250-mm) lock blocks][5-inch (125-mm) midrail blocking], in doors indicated to have exit devices.
9. Construction:
- a. Three plies, hot-pressed bonded (vertical and horizontal edging is bonded to core), with entire unit abrasive planed before faces are applied.

2.4 LIGHT FRAMES AND LOUVERS

- A. Metal Frames for all Light Openings in Fire-Rated Doors and Non-Fire-Rated Doors: Manufacturer's standard frame formed of 0.048-inch- (1.2-mm-) thick, cold-rolled steel sheet; factory primed for paint finish; and approved for use in doors of fire-protection rating indicated on Drawings.
- B. Wood Louvers: Door manufacturer's standard solid-wood louvers unless otherwise indicated.
 - 1. Wood Species: Same species as door faces.
 - 2. Profile: Flat.
- C. Metal Louvers:
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include,

but are not limited to, the following:

- a. Allegion plc
 - b. Anemostat Air Distribution; Anemostat, Inc.; Mestek, Inc.
 - c. ASSA ABLOY
 - d. JL Industries; Activar Construction Products Group, Inc.
 - e. L & L Louvers, Inc.
 - f. McGill Architectural Products
2. Blade Type: Vision-proof, inverted V.
 3. Metal and Finish:
 - a. Extruded aluminum with Class II, clear anodic finish, AA-M12C22A31, or Class II, color anodic finish, AA-M12C22A32/A34, as selected by Architect from manufacturer's standard colors.
 4. Metal and Finish: Hot-dip galvanized steel, 0.040 inch (1.0 mm) thick, factory primed for paint finish.

2.5 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated.
 1. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
 2. Comply with NFPA 80 requirements for fire-rated doors.
- B. Factory machine doors for hardware that is not surface applied.
 1. Locate hardware to comply with DHI-WDHS-3.
 2. Comply with final hardware schedules, door frame Shop Drawings, ANSI/BHMA-156.115-W, and hardware templates.
 3. Coordinate with hardware mortises in metal frames, to verify dimensions and alignment before factory machining.
 4. For doors scheduled to receive electrified locksets, provide factory-installed raceway and wiring to accommodate specified hardware.
 5. Metal Astragals: Factory machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.
- C. Openings: Factory cut and trim openings through doors.
 1. Light Openings: Trim openings with moldings of material and profile indicated.
 2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 088000 "Glazing."
 3. Louvers: Factory install louvers in prepared openings.

EXECUTION

2.6 EXAMINATION

- A. Examine doors and installed door frames, with Installer present, before hanging doors.
 - 1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
 - 2. Reject doors with defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

2.7 INSTALLATION

- A. Hardware: For installation, see [Section 087100 "Door Hardware."][Section 087111 "Door Hardware (Descriptive Specification)."]
- B. Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.
 - 1. Install fire-rated doors in corresponding fire-rated frames in accordance with NFPA 80.
 - 2. Install smoke- and draft-control doors in accordance with NFPA 105.
- C. Job-Fitted Doors:
 - 1. Align and fit doors in frames with uniform clearances and bevels as indicated below.
 - a. Do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors.
 - 2. Machine doors for hardware.
 - 3. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
 - 4. Clearances:
 - a. Provide **1/8 inch (3.2 mm)** at heads, jambs, and between pairs of doors.
 - b. Provide **1/8 inch (3.2 mm)** from bottom of door to top of decorative floor finish or covering unless otherwise indicated on Drawings.
 - c. Where threshold is shown or scheduled, provide **1/4 inch (6.4 mm)** from bottom of door to top of threshold unless otherwise indicated.
 - d. Comply with NFPA 80 for fire-rated doors.
 - 5. Bevel non-fire-rated doors **1/8 inch in 2 inches (3-1/2 degrees)** at lock and hinge edges.
 - 6. Bevel fire-rated doors **1/8 inch in 2 inches (3-1/2 degrees)** at lock edge; trim stiles and rails only to extent permitted by labeling agency.
- D. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

2.8 ADJUSTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 081416

DIVISION 8 OPENINGS

SECTION 083113 - ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes access doors and frames for walls and ceilings.
- B. Related Requirements:
 - 1. Divisions: 21- Fire Protection, 22-Plumbing, 23-HVAC, 26- Electrical, 27- Communications and 28-Electronic Safety.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, fire ratings, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Product Schedule: For access doors and frames use Room Name designation where wall or ceiling access doors are located.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Access Doors and Frames: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection and temperature-rise limit ratings indicated, according to NFPA 252 or UL 10B.

2.2 ACCESS DOORS AND FRAMES

- A. Flush Access Doors with Concealed Flanges :
- B. Provide Wall or Ceiling Access Doors for physical access to service concealed mechanical, plumbing, or electrical valves, appliances, or other devices needed for the operation and maintenance of concealed equipment and or building systems. Refer to

Divisions: 21-Fire Protection, 22-Plumbing, 23-HVAC, 26-Electrical, 27-Communications and 28-Electronic Safety

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Acudor Products, Inc.
 - b. Babcock-Davis.
 - c. Bar-co, Alfab, Inc., Enterprise, AL.
 - d. JL Industries, Inc.; a division of the Activar Construction Products Group.
 - e. Karp Associates, Inc.
 - f. Larsens Manufacturing Company.
 - g. Milcor; Commercial Products Group of Hart & Cooley, Inc.
 - h. Nystrom, Inc.
 - i. Williams Bros. Corporation of America (The).
2. Description: Face of door flush with frame; with concealed flange for gypsum board installation and concealed hinge.
3. Locations: Wall and ceiling.
4. Door Size: Minimum 30 inches by 30 inches or as scheduled or noted on the drawings.
5. Uncoated Steel Sheet for Door: Nominal **0.060 inch**, 16 gage, factory primed.
6. Frame Material: Same material and thickness as door.
7. Latch and Lock: Cam latch, hex-head wrench operated.
8. Basis of Design: Babcock-Davis Model "BNW"

2.3 DRAFT STOP ACCESS DOORS AND FRAMES

A. Flush Access Doors with Concealed Flanges:

B. Provide Draft Stop Access Doors as indicated on drawings.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Acudor Products, Inc.
 - b. Babcock-Davis.
 - c. Bar-co, Alfab, Inc., Enterprise, AL.
 - d. JL Industries, Inc.; a division of the Activar Construction Products Group.
 - e. Karp Associates, Inc.
 - f. Larsens Manufacturing Company.
 - g. Milcor; Commercial Products Group of Hart & Cooley, Inc.
 - h. Nystrom, Inc.
 - i. Williams Bros. Corporation of America (The).
2. Description: Non-rated access door designed to provide access through draft stop spaces in the attic while preventing a back draft from one section to the attic to another. Self-closing and self-latching access door allowing for access from

- both sides of the door.
- 3. Locations: Wall
- 4. Door Size: Minimum 30 inches by 30 inches or as scheduled or noted on the drawings.
- 5. Uncoated Steel Sheet for Door: 14 gauge, white powder coat.
- 6. Frame Material: 16 gauge, white powder coat.
- 7. Latch and Lock: Knurled Knob/Keyed Slam Latch
- 8. Basis of Design: Babcock-Davis Model "BDW"

2.4 FIRE-RATED ACCESS DOORS AND FRAMES

- A. Flush Access Doors with Concealed Flanges:
- B. Provide Smoke Rated Access Doors where access doors must be located in Smoke Rated construction.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Acudor Products, Inc.
 - b. Babcock-Davis.
 - c. Cendrex Inc.
 - d. JL Industries, Inc.; a division of the Activar Construction Products Group.
 - e. Karp Associates, Inc.
 - f. MIFAB, Inc.
 - g. Nystrom, Inc.
 - h. Williams Bros. Corporation of America .
 - 2. Description: Door face flush with frame, with concealed flange for installation, self-closing door, and concealed hinge.
 - 3. Locations: Wall and ceiling.
 - 4. Door Sizes: 18 inches by 18 inches minimum size or as noted on the drawings for larger sizes.
 - 5. Uncoated Steel Sheet for Door: Nominal **0.036 inch**, 20 gage, factory primed.
 - 6. Frame Material: Same material, thickness, and finish as door.
 - 7. Latch and Lock: Self-closing, self-latching door hardware, operated with key operated latch bolt.
 - 8. Basis of Design: Babcock-Davis Model "BIW" gypsum board.

2.5 MATERIALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A 879/A 879M, with cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.
- C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum **G60** or **A60** metallic coating.

- D. Frame Anchors: Same material as door face.
- E. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

2.6 FABRICATION

- A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.
- B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.
- C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish mounting holes, attachment devices and fasteners of type required to secure access doors to types of supports indicated.
 - 1. For concealed flanges with drywall bead, provide edge trim for gypsum panels securely attached to perimeter of frames.
 - 2. For concealed flanges with plaster bead for full-bed plaster applications, provide zinc-coated expanded-metal lath and exposed casing bead welded to perimeter of frames.
- D. Recessed Access Doors: Form face of panel to provide recess for application of applied finish. Reinforce panel as required to prevent buckling. Provide access sleeves for each latch operator and install in holes cut through finish.
 - 1. For recessed doors with plaster infill, provide self-furring expanded-metal lath attached to door panel.
- E. Latch and Lock Hardware:
 - 1. Quantity: Furnish number of latches and locks required to hold doors tightly closed.
 - 2. Keys: Furnish two keys per lock and key all locks alike.

2.7 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Painted Finishes: Comply with coating manufacturer's written instructions for cleaning,

conversion coating, and applying and baking finish.

1. Factory Primed: Apply manufacturer's standard, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with manufacturer's written instructions for installing access doors and frames.

3.3 ADJUSTING

- A. Adjust doors and hardware, after installation, for proper operation.

END OF SECTION 083113

DIVISION 8 OPENINGS

SECTION 084113 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Aluminum-framed entrance and storefront systems.
2. Fixed aluminum-framed windows.

B. Related Requirements:

1. Section 08000 "Glazing"

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Construction details, material descriptions, dimensions of individual components and profiles, and finishes.
2. Operating characteristics, electrical characteristics, and furnished accessories.

B. Shop Drawings:

1. Plans, elevations, sections, full-size details, and attachments to other work.
2. Details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
3. Full-size isometric details of each type of vertical-to-horizontal intersection of aluminum-framed entrance and storefront systems, showing the following:
 - a. Joinery, including concealed welds.
 - b. Anchorage.
 - c. Expansion provisions.
 - d. Glazing.
 - e. Flashing and drainage.
4. Connection to and continuity with adjacent thermal, weather, air, and vapor barriers.
5. Signed and sealed by the qualified professional engineer responsible for their preparation.

C. Samples for Initial Selection: Manufacturer's standard color sheets, showing full range of available colors for each type of exposed finish.

D. Samples for Verification: Actual sample of finished products for each type of exposed finish.

1. Size: Manufacturers' standard size.

E. Entrance Door Hardware Schedule: Prepared by or under supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams.

Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Statements:

1. For Installer.

B. Sample Warranties: For aluminum-framed entrance and storefront systems.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For aluminum-framed entrance and storefront systems.

1.5 QUALITY ASSURANCE

A. Installer Qualifications:

1. Authorized representative who is trained and approved by manufacturer.

B. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.

1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

1.6 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of aluminum-framed entrance and storefront systems that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

- a. Structural failures, including but not limited to, excessive deflection.
- b. Faulty operation of doors and other operating components.
- c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
- d. Noise or vibration created by wind and thermal and structural movements.
- e. Water penetration through fixed glazing and framing areas.

2. Warranty Period: 10 years from date of Substantial Completion.

B. Special Finish Warranty, Anodized Finishes: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of anodized finishes within specified warranty period.

1. Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Delta E units when tested in accordance with ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D 4214.
 - c. Cracking, peeling, or chipping.
2. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Obtain all components of aluminum-framed entrance and storefront system, including framing and accessories, from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrance and storefront systems representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
 1. Aluminum-framed entrance and storefront systems to withstand movements of supporting structure, including, but not limited to, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
 2. Failure also includes the following:
 - a. Thermal stresses transferring to building structure.
 - b. Glass breakage.
 - c. Noise or vibration created by wind and thermal and structural movements.
 - d. Loosening or weakening of fasteners, attachments, and other components.
 - e. Failure of operating units.
- B. Structural Loads:
 1. Wind Loads: As indicated on Drawings.
- C. Deflection of Framing Members Supporting Glass: At design wind load, as follows:
 1. Deflection Normal to Wall Plane: Limited to 1/175 of length of span of the framing member for lengths of up to 13 feet 6 inches and to 1/240 of length of span of the framing member plus 1/4 inch for lengths greater than 13 feet 6 inches.
 2. Deflection Parallel to Glazing Plane: Limited to amount not exceeding that which reduces glazing bite to less than 75 percent of design dimension and that which reduces edge clearance between framing members and glazing or other fixed components to less than 1/8 inch.
 - a. Operable Units: Provide a minimum 1/16-inch clearance between framing members and operable units.
- D. Structural: Test in accordance with ASTM E330/E330M as follows:

1. When tested at positive and negative wind-load design pressures, storefront assemblies, including entrance doors, do not evidence deflection exceeding specified limits.
2. When tested at 150 percent of positive and negative wind-load design pressures, storefront assemblies, including entrance doors and anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.
3. Test Durations: As required by design wind velocity, but not less than 10 seconds.

E. Water Penetration under Static Pressure: Test in accordance with ASTM E331 as follows:

1. No evidence of water penetration through fixed glazing and framing areas, including entrance doors, when tested in accordance with a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft..

F. Energy Performance: Certified and labeled by manufacturer for energy performance as follows:

1. Thermal Transmittance (U-factor):

- a. Fixed Glazing and Framing Areas: U-factor for the system of not more than 0.57 Btu/sq. ft. x h x deg F as determined in accordance with NFRC 100.
- b. Entrance Doors: U-factor of not more than 0.83 Btu/sq. ft. x h x deg F as determined in accordance with NFRC 100.
- c. Venting Windows: Whole window U-factor of not more than 0.60 Btu/sq. ft. x h x deg F as determined in accordance with NFRC 100.

2. Solar Heat-Gain Coefficient (SHGC):

- a. Fixed Glazing and Framing Areas: SHGC for the system of not more than 0.26 as determined in accordance with NFRC 200.
- b. Entrance Doors: SHGC of not more than 0.35 as determined in accordance with NFRC 200.
- c. Venting Windows: Whole window SHGC of not more than 0.27 as determined in accordance with NFRC 200.

3. Air Leakage:

- a. Fixed Glazing and Framing Areas: Air leakage for the system of not more than 0.06 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft. when tested in accordance with ASTM E283.
- b. Entrance Doors: Air leakage of not more than 1.0 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft..
- c. Venting Windows: Whole window air leakage of not more than 0.3 cfm/sq. ft. at a static-air-pressure differential of 6.24 lbf/sq. ft. when tested in accordance with AAMA/WDMA/CSA 101/I.S.2/A440.

G. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.3 ALUMINUM-FRAMED ENTRANCE AND STOREFRONT SYSTEMS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Kawneer Trifab VG 451, or US Aluminum 451S or comparable product by one of the following:

1. Kawneer Company, Inc.; Arconic Corporation
 2. Tubelite Inc.
 3. U.S. Aluminum; C.R. Laurence Co., Inc.; CRH Americas, Inc.
 4. Manko
- B. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.
1. Exterior Framing Construction: Nonthermal.
 2. Interior Vestibule Framing Construction: Nonthermal.
 3. Glazing System: Retained mechanically with gaskets on four sides.
 4. Glazing Plane: Center-glazed.
 5. Finish: Color anodic finish.
 6. Fabrication Method: Field-fabricated stick system.
 7. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
 8. Steel Reinforcement: As required by manufacturer.
- C. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.
- D. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- E. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing or automatic operation.
1. Door Construction: 1-3/4-inch overall thickness, with minimum 0.125-inch- thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.
 2. Door Design: Medium stile; 3-1/2-inch nominal width.
 3. Glazing Stops and Gaskets: Beveled, snap-on, extruded-aluminum stops and preformed gaskets.
 - a. Provide nonremovable glazing stops on outside of door.
 4. Finish: Match adjacent storefront framing finish.

2.4 ENTRANCE DOOR HARDWARE

- A. Entrance Door Hardware: Hardware not specified in this Section is specified in Section 087100 "Door Hardware."
- B. General: Provide entrance door hardware and entrance door hardware sets indicated in "Entrance Door Hardware Sets" Article for each entrance door, to comply with requirements in this Section.
1. Entrance Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and products equivalent in function and comparable in quality to named products.
 2. Opening-Force Requirements:
 - a. Egress Doors: Not more than 15 lbf to release the latch and not more than 30 lbf to set the door in motion and not more than 15 lbf to open the door to its minimum required width.

- b. Accessible Interior Doors: Not more than 5 lbf to fully open door.
- C. Designations: Requirements for design, grade, function, finish, quantity, size, and other distinctive qualities of each type of entrance door hardware are indicated in "Entrance Door Hardware Sets" Article. Products are identified by using entrance door hardware designations as follows:
 - 1. References to BHMA Standards: Provide products complying with these standards and requirements for description, quality, and function.
- D. Pivot Hinges: BHMA A156.4, Grade 1.
 - 1. Offset-Pivot Hinges: Provide top, bottom, and intermediate offset pivots at each door leaf.
- E. Mortise Auxiliary Locks: BHMA A156.5, Grade 1.
- F. Panic Exit Devices: BHMA A156.3, Grade 1, listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing in accordance with UL 305.
- G. Cylinders:
 - 1. As specified in Section 087100 "Door Hardware."
- H. Strikes: Provide strike with black-plastic dust box for each latch or lock bolt; fabricated for aluminum framing.
- I. Operating Trim: BHMA A156.6.
- J. Removable Mullions: BHMA A156.3 extruded aluminum.
 - 1. When used with panic exit devices, provide keyed removable mullions listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing in accordance with UL 305. Use only mullions that have been tested with exit devices to be used.
- K. Closers: BHMA A156.4, Grade 1, with accessories required for a complete installation, sized as required by door size, exposure to weather, and anticipated frequency of use; adjustable to comply with field conditions and requirements for opening force.
- L. Door Stops: BHMA A156.16, Grade 1, floor or wall mounted, as appropriate for door location indicated, with integral rubber bumper.
- M. Weather Stripping: Manufacturer's standard replaceable components.
 - 1. Compression Type: Made of ASTM D2000 molded neoprene or ASTM D2287 molded PVC.
 - 2. Sliding Type: AAMA 701/702, made of wool, polypropylene, or nylon woven pile with nylon-fabric or aluminum-strip backing.
- N. Weather Sweeps: Manufacturer's standard exterior-door bottom sweep with concealed fasteners on mounting strip.
- O. Thresholds: BHMA A156.21 raised thresholds beveled with a slope of not more than 1:2, with maximum height of 1/2 inch.

2.5 GLAZING

- A. Glazing: Comply with Section 088000 "Glazing."
- B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.
- C. Glazing Sealants: As recommended by manufacturer.

2.6 MATERIALS

- A. Sheet and Plate: ASTM B209.
- B. Extruded Bars, Rods, Profiles, and Tubes: ASTM B221.
- C. Structural Profiles: ASTM B308/B308M.
- D. Steel Reinforcement:
 - 1. Structural Shapes, Plates, and Bars: ASTM A36/A36M.
 - 2. Cold-Rolled Sheet and Strip: ASTM A1008/A1008M.
 - 3. Hot-Rolled Sheet and Strip: ASTM A1011/A1011M.
- E. Steel Reinforcement Primer: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods in accordance with recommendations in SSPC-SP COM, and prepare surfaces in accordance with applicable SSPC standard.

2.7 ACCESSORIES

- A. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
 - 1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
 - 2. Reinforce members as required to receive fastener threads.
 - 3. Use exposed fasteners with countersunk Phillips screw heads, finished to match framing system.
- B. Anchors: Three-way adjustable anchors with minimum adjustment of **1 inch** that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.
 - 1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A123/A123M or ASTM A153/A153M requirements.
- C. Bituminous Paint: Cold-applied asphalt-mastic paint containing no asbestos, formulated for 30-mil thickness per coat.

2.8 FABRICATION

- A. Form or extrude aluminum shapes before finishing.

- B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- C. Fabricate components that, when assembled, have the following characteristics:
 - 1. Profiles that are sharp, straight, and free of defects or deformations.
 - 2. Accurately fitted joints with ends coped or mitered.
 - 3. Physical and thermal isolation of glazing from framing members.
 - 4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
 - 5. Provisions for field replacement of glazing from interior for vision glass and exterior for spandrel glazing or metal panels.
 - 6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.
- E. Structural-Sealant-Glazed Framing Members: Include accommodations for using temporary support device to retain glazing in place while structural sealant cures.
- F. Storefront Framing: Fabricate components for assembly using screw-spline system.
- G. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.
 - 1. At interior and exterior doors, provide compression weather stripping at fixed stops.
- H. Entrance Doors: Reinforce doors as required for installing entrance door hardware.
 - 1. At pairs of exterior doors, provide sliding-type weather stripping retained in adjustable strip and mortised into door edge.
 - 2. At exterior doors, provide weather sweeps applied to door bottoms.
- I. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.
- J. After fabrication, clearly mark components to identify their locations in Project in accordance with Shop Drawings.

2.9 ALUMINUM FINISHES

- A. Color Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.
 - 1. Color: As selected by Architect from full range of industry colors and color densities.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF ALUMINUM-FRAMED ENTRANCE AND STOREFRONT SYSTEMS

- A. Comply with manufacturer's written instructions.
- B. Do not install damaged components.
- C. Fit joints to produce hairline joints free of burrs and distortion.
- D. Rigidly secure nonmovement joints.
- E. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
- F. Seal perimeter and other joints watertight unless otherwise indicated.
- G. Metal Protection:
 - 1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.
 - 2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- H. Set continuous sill members and flashing in full sealant bed, as specified in Section 079200 "Joint Sealants," to produce weathertight installation.
- I. Install joint filler behind sealant as recommended by sealant manufacturer.
- J. Install components plumb and true in alignment with established lines and grades.
- K. Install operable units level and plumb, securely anchored, and without distortion. Adjust weather-stripping contact and hardware movement to produce proper operation.
- L. Install entrance doors to produce smooth operation and tight fit at contact points.
 - 1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.
 - 2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware in accordance with entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.
- M. Install glazing as specified in Section 088000 "Glazing."

3.3 ERECTION TOLERANCES

- A. Install aluminum-framed entrance and storefront systems to comply with the following maximum tolerances:
 - 1. Plumb: 1/8 inch in 10 feet; 1/4 inch in 40 feet.
 - 2. Level: 1/8 inch in 20 feet; 1/4 inch in 40 feet.
 - 3. Alignment:

- a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch wide, limit offset from true alignment to 1/16 inch.
 - b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch wide, limit offset from true alignment to 1/8 inch.
 - c. Where surfaces are separated by reveal or protruding element of 1 inch wide or more, limit offset from true alignment to 1/4 inch.
4. Location: Limit variation from plane to 1/8 inch in 12 feet; 1/2 inch over total length.

3.4 MAINTENANCE SERVICE

A. Entrance Door Hardware Maintenance:

1. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of entrance door hardware.

3.5 ENTRANCE DOOR HARDWARE SETS

- A. (Lock cylinders and door stops are specified in Division-8 "Door Hardware" section.).
- B. It is the intent of this schedule of openings to specify necessary Finishing Hardware for each and every opening. Should any opening be omitted or any Hardware that is obviously necessary for the completion of Building, Hardware of equal quality and design as specified for a similar opening shall be used. The supplier will be expected to furnish Hardware for all openings. No extras allowed for Hardware not covered in schedule

1. HARDWARE SET NO. A-1 (FOR EACH SINGLE EXTERIOR MEDIUM STILE ALUMINUM ENTRANCE DOOR WITH "BUZZ-IN" ELECTRIC STRIKE ACCESS CONTROL)
 - a. 1 "Kawneer" 350 Series Medium Stile Entrance Door, or US Aluminum 400 Series Entrance Door
 - b. 1 Top Offset Pivot
 - c. 1 Intermediate Offset-Pivot
 - d. 1 Bottom Offset Pivot
 - e. 1 "LCN" 4040-H Closer, or equal (with adapter plates / brackets as required to suit door application)
 - f. ASSA ABLOY ACCENTRA nexTouch Cylindrical Keypad Lock, or equal with (inside and outside) lever handles, or equal
 - g. 1 "BUZZ-IN" Electric Strike, "Adams Rite" 7140-310-628-00, or equal.
 - h. 1 EA Power Supply (voltage as required to be compatible with electric strike)
 - i. 1 EA REMOTE PUSH BUTTON TS-18, located under Reception counter.
 - j. Low voltage wiring (run concealed) from electric strike to push button.
 - k. Door remains locked from the exterior side during business hours. Activating the push button remotely from Reception area will unlock the door momentarily. The door will be locked from the exterior side upon closing. Free egress from the inside shall always be maintained.
 - l. 1 "Pemko" #158A threshold, or equal, or manufacturer's standard A.D.A. compliant saddle threshold (1/2" maximum height)
 - m. 1 set "Kawneer" "Sealair" Weatherstripping, or equal
 - n. 1 Door bottom rail weathering, "Kawneer" No. 38-560, or equal (installed on inside face of door)

2. HARDWARE SET NO. A-2 (FOR SINGLE EXTERIOR ALUMINUM DOOR)

- a. 1 "Kawneer" 350 Series Medium Stile Entrance Door, or US Aluminum 400 Series Entrance Door
- b. 1 Top Offset Pivot
- c. 1 Intermediate Offset-Pivot
- d. 1 Bottom Offset Pivot
- e. 1 "LCN" 4040-H Closer, or equal (with adapter plates / brackets as required to suit door application)
- f. 1 Dead Latch Lock - "Adams Rite" 4510 (or 4710 series) deadlatch with two No. 4560-601-121 (inside and outside) lever handles, or equal
- g. 1 "Pemko" #158A threshold, or equal, or manufacturer's standard A.D.A. compliant saddle threshold (1/2" maximum height)
- h. 1 set "Kawneer" "Sealair" Weatherstripping, or equal
- i. 1 Door bottom rail weathering, "Kawneer" No. 38-560, or equal (installed on inside face of door)
- j. 1 Door bottom drip on exterior side of all exterior doors - "Pemko" # 3452AV, set in bed of sealant
- k. 1 Top raindrip cap on exterior side of exterior door frame - "Pemko" # 346C, set in bed of sealant

C. THE FOLLOWING SPECIAL FINISH NOTE APPLIES TO ALL OF THE ABOVE HARDWARE SETS:

- 1. Special Finish: Exposed surfaces of hardware for dark bronze anodized aluminum doors shall have oxidized oil rubbed bronze finish (dark bronze). Finish on door closers shall closely match doors.

END OF SECTION 084113

DIVISION 8 - OPENINGS
SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Hinges.
2. Self-closing hinges and pivots.
3. Center-hung and offset pivots.
4. Bored locks.
5. Bored auxiliary locks.
6. Electric strikes.
7. Self-contained electronic locks.
8. Manual flush bolts.
9. Automatic flush bolts.
10. Self-latching flush bolts.
11. Lock cylinders.
12. Operating trim.
13. Surface closers.
14. Wall- and floor-mounted stops.
15. Overhead stops and holders.
16. Door gasketing.
17. Thresholds.
18. Metal protective trim units.
19. Auxiliary door hardware.

1.2 COORDINATION

- A. Installation Templates: Distribute for doors, frames, and other work specified to be factory prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- B. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.
- C. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.
- D. Existing Openings: Where hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field-verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide proper door operation.

1.3 PREINSTALLATION MEETINGS

- A. Keying Conference: Conduct conference at Architect's Office.

1. Conference participants must include Installer's Architectural Hardware Consultant.
2. Incorporate conference decisions into keying schedule after reviewing door hardware keying system, including, but not limited to, the following:
 - a. Flow of traffic and degree of security required.
 - b. Preliminary key system schematic diagram.
 - c. Requirements for access control.
 - d. Address for delivery of keys.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: For electrified door hardware.

1. Include diagrams for power, signal, and control wiring.
2. Include details of interface of electrified door hardware and building safety and security systems.

C. Door Hardware Schedule: Prepared by or under the supervision of Installer's Architectural Hardware Consultant. Coordinate door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Submittal Sequence: Submit door hardware schedule concurrent with submissions of product data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate the fabrication of other work that is critical in Project construction schedule.
2. Format: Use same scheduling sequence and format and use same door numbers as in door hardware schedule in the Contract Documents.
3. Content: Include the following information:
 - a. Identification number, location, hand, fire rating, size, and material of each door and frame.
 - b. Locations of each door hardware set, cross-referenced to Drawings on floor plans and to door and frame schedule.
 - c. Complete designations, including name and manufacturer, type, style, function, size, quantity, function, and finish of each door hardware product.
 - d. Description of electrified door hardware sequences of operation and interfaces with other building control systems.
 - e. Fastenings and other installation information.
 - f. Explanation of abbreviations, symbols, and designations contained in door hardware schedule.
 - g. Mounting locations for door hardware.
 - h. List of related door devices specified in other Sections for each door and frame.

D. Keying Schedule: Prepared by or under the supervision of Installer's Architectural Hardware Consultant, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations that are coordinated with the Contract Documents.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Architectural Hardware Consultant.
- B. Product Certificates: For each type of electrified door hardware.
 - 1. Certify that door hardware for use on each type and size of labeled fire-rated doors complies with listed fire-rated door assemblies.
- C. Product Test Reports: For compliance with accessibility requirements, for tests performed by manufacturer and witnessed by a qualified testing agency, for door hardware on doors located in accessible routes.
- D. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of door hardware to include in maintenance manuals.
- B. Schedules: Final keying schedule.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: Supplier of products and an employer of workers trained and approved by product manufacturers and of an Architectural Hardware Consultant who is available during the course of the Work to consult Contractor, Architect, and Owner about door hardware and keying.
 - 1. Scheduling Responsibility: Preparation of door hardware and keying schedule.
 - 2. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
- B. Architectural Hardware Consultant Qualifications: A person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and who is currently certified by DHI as an Architectural Hardware Consultant (AHC) and an Electrified Hardware Consultant (EHC).

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lockup for door hardware delivered to Project site.
- B. Tag each item or package separately with identification coordinated with the final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.
- C. Deliver keys and permanent cores to Owner by registered mail or overnight package service.

1.9 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
 - a. Structural failures, including excessive deflection, cracking, or breakage.
 - b. Faulty operation of doors and door hardware.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
2. Warranty Period: Three years from date of Substantial Completion unless otherwise indicated below:
 - a. Electromagnetic and Delayed-Egress Locks: Five years from date of Substantial Completion.
 - b. Exit Devices: Three years mechanical, one year electrical from date of Substantial Completion.
 - c. Manual Closers: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Obtain each type of door hardware from single manufacturer.
1. Provide electrified door hardware from same manufacturer as mechanical door hardware unless otherwise indicated. Manufacturers that perform electrical modifications and that are listed by a testing and inspecting agency acceptable to authorities having jurisdiction are acceptable.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Door Assemblies: Where fire-rated doors are indicated, provide door hardware complying with NFPA 80 that is listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure in accordance with NFPA 252 or UL 10C.
- B. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that complies with requirements of assemblies tested in accordance with UL 1784 and installed in compliance with NFPA 105.
1. Air-Leakage Rate: Maximum air leakage of 0.3 cfm per sq. ft. at the tested pressure differential of 0.3 inch wg of water.
- C. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- D. Means of Egress Doors: Latches do not require more than 15 lbf to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.
- E. Accessibility Requirements: For door hardware on doors in an accessible route, comply with the

USDOJ's "2010 ADA Standards for Accessible Design".

1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf.
2. Comply with the following maximum opening-force requirements:
 - a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf applied perpendicular to door.
 - b. Sliding or Folding Doors: 5 lbf applied parallel to door at latch.
 - c. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
3. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch high.
4. Adjust door closer sweep periods so that, from an open position of 90 degrees, the door will take at least 5 seconds to move to a position of 12 degrees from the latch.
5. Adjust spring hinges so that, from an open position of 70 degrees, the door will take at least 1.5 seconds to move to the closed position.

2.3 HINGES

- A. Hinges: ANSI/BHMA A156.1. Provide template-produced hinges for hinges installed on hollow-metal doors and hollow-metal frames.
 1. Basis-of-Design Product: Subject to compliance with requirements, provide Type A5112 Stanley FBB191-630 or McKinney TA2314-US32D at exterior doors, Type A8112 Stanley FBB179, Hager BB1279 or McKinney TA2714 at interior doors with closers and Type A8133 Stanley F179, Hager 1279 or McKinney T2714 at interior doors without closers, or comparable product by one of the following:
 - a. Hager
 - b. McKinney
 - c. Stanley
 2. Hinge size: 4-1/2 x 4-1/2 for doors up to 3'-6" wide; 5 x 4-1/2 for doors 3'-8" and wider.
 3. Three hinges for doors up to 7'-6" tall.
 4. Four hinges for doors from 7"-7" to 96" tall.
 5. Five hinges for doors over 96" tall.
 6. Non-removable pins at exterior doors, out-swing corridor doors with locks, and out-swing storage room doors with locks.
 7. Non-rising pins at interior doors.
 8. Templates: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units.
 9. Screws: Provide Phillips flat-head screws complying with the following requirements:
 - a. For metal doors and frames install machine screws into drilled and tapped holes.
 - b. For wood doors and frames install wood screws.
 - c. For fire-rated wood doors install #12 x 1-1/4-inch, threaded-to-the-head steel wood screws.
 - d. Finish screw heads to match surface of hinges or pivots.
 10. See "HARDWARE SETS" for pivots and hinges other than butts specified above.

2.4 SELF-CLOSING HINGES AND PIVOTS

- A. Self-Closing Hinges and Pivots: ANSI/BHMA A156.17.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. **Allegion plc**
 - b. **Bommer Industries, Inc**
 - c. **Hager Companies**
 - d. **McKinney Products Company; ASSA ABLOY Accessories and Door Controls Group, Inc.; ASSA ABLOY**

2.5 CENTER-HUNG AND OFFSET PIVOTS

A. Center-Hung and Offset Pivots: ANSI/BHMA A156.4.

1. Manufacturers: Subject to compliance with requirements **available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:**
 - a. **Accurate Lock & Hardware Co.**
 - b. **Allegion plc**
 - c. **dormakaba USA Inc.**
 - d. **Hager Companies**
 - e. **Rixson Specialty Door Controls; ASSA ABLOY**

2.6 MECHANICAL LOCKS AND LATCHES

- A. Lock Functions: As indicated in door hardware schedule.
- B. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:
 1. Bored Locks: Minimum 1/2-inch latch bolt throw.
 2. Mortise Locks: Minimum 3/4-inch latch bolt throw.
 3. Deadbolts: Minimum 1-inch bolt throw.
- C. Lock Backset: 2-3/4 inches unless otherwise indicated.
- D. Lock Trim:
 1. Description: Chassis: cylindrical design, corrosion-resistant plated cold-rolled steel, through-bolted.
 2. Levers: Cast.
 - a. Lever Trim: accessible design, independent operation, spring-cage supported, minimum 2" clearance from lever mid-point to door face.
 3. Escutcheons (Roses): Wrought.
 4. Dummy Trim: Match lever lock trim and escutcheons.
- E. Strikes: Provide manufacturer's standard strike for each lock bolt or latch bolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.

1. Flat-Lip Strikes: For locks with three-piece antifriction latch bolts, as recommended by manufacturer.
2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3. Aluminum-Frame Strike Box: Manufacturer's special strike box fabricated for aluminum framing.
4. Rabbet Front and Strike: Provide on locksets for rabbeted meeting stiles.

F. Bored Locks: ANSI/BHMA A156.2, Grade 1, Series 4000.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. **Allegion plc**
 - b. **BEST Access Solutions, Inc.; dormakaba USA Inc.**
 - c. **Corbin Russwin, Inc.; an ASSA ABLOY Group company**
 - d. **Falcon**
 - e. **Schlage**
 - f. **Yale Security Inc; ASSA ABLOY**

2.7 AUXILIARY LOCKS

A. Bored Auxiliary Locks: ANSI/BHMA A156.36, [**Grade 1**][**Grade 2**]; with strike that suits frame.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. **Allegion plc**
 - b. **BEST Access Solutions, Inc.; dormakaba USA Inc.**
 - c. **Corbin**
 - d. **Falcon**
 - e. **Schlage**
 - f. **Yale Security Inc; ASSA ABLOY**

2.8 ELECTRIC STRIKES

A. Electric Strikes: ANSI/BHMA A156.31, Grade 1; with faceplate to suit lock and frame.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. **Adams Rite Manufacturing Company, an ASSA ABLOY Group company**
 - b. **Allegion plc**
 - c. **ASSA ABLOY Electronic Security Hardware; ASSA ABLOY**
 - d. **Hager Companies**
 - e. **STANLEY; dormakaba USA, Inc.**

2.9 SELF-CONTAINED ELECTRONIC LOCKS

A. Self-Contained Electronic Locks: ANSI/BHMA A156.25, bored; with internal, battery-powered, self-contained electronic locks; consisting of complete lockset, motor-driven lock mechanism,

and actuating device; enclosed in zinc-dichromate-plated, wrought-steel case, and strike that suits frame. Provide key override, low-battery detection and warning, LED status indicators, and ability to program at the lock.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. **Allegion plc**
- b. **BEST Access Solutions, Inc.; dormakaba USA Inc.**
- c. **SARGENT Manufacturing Company; ASSA ABLOY**
- d. **Yale Security Inc; ASSA ABLOY**
- e. **Schlage Keypad Lever Locks; Allegion**

2.10 MANUAL FLUSH BOLTS

- A. Manual Flush Bolts: ANSI/BHMA A156.16; minimum 3/4-inch throw; designed for mortising into door edge.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. **Allegion plc**
 - b. **Ives**
 - c. **Trimco**
2. Flush bolts shall be Type L24081 unless otherwise specified.
3. Furnish proper dustproof strikes conforming to ANSI A156.16, for flush bolts required on lower part of doors.
4. Modify flush bolts to fit stiles of aluminum doors on double acting doors.
5. Face plates for cylindrical strikes shall be rectangular and not less than 25 mm by 63 mm (1 inch by 2 1/2 inches).
6. Friction fit cylindrical dustproof strikes with circular face plate may be used only where metal thresholds occur.

2.11 AUTOMATIC AND SELF-LATCHING FLUSH BOLTS

- A. Automatic Flush Bolts: ANSI/BHMA A156.3, Type 25; minimum 3/4-inch throw; with dust-proof strikes; designed for mortising into door edge. Include wear plates.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. **Allegion plc**
 - b. **Ives**
 - c. **Trimco**
2. Dimension of flush bolts shall conform to ANSI A115.
3. Bolts shall conform to Underwriters Laboratories, Inc., requirements for fire door hardware.
4. Flush bolts shall automatically latch and unlatch.
5. Furnish dustproof strikes conforming to ANSI A156.16 for bottom flushbolt.

6. Face plates for dustproof strike shall be rectangular and not less than 38 mm by 90 mm (1 1/2 by 3 1/2 inches).
- B. Self-Latching Flush Bolts: ANSI/BHMA A156.3, Type 27; minimum 3/4-inch throw; with dust-proof strikes; designed for mortising into door edge. Include wear plates.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. **Allegion plc**
 - b. **Ives**
 - c. **Trimco**
 2. Dimension of flush bolts shall conform to ANSI A115.
 3. Bolts shall conform to Underwriters Laboratories, Inc., requirements for fire door hardware.
 4. Flush bolts shall automatically latch and unlatch.
 5. Furnish dustproof strikes conforming to ANSI A156.16 for bottom flushbolt.
 6. Face plates for dustproof strike shall be rectangular and not less than 38 mm by 90 mm (1 1/2 by 3 1/2 inches).

2.12 EXIT DEVICES AND AUXILIARY ITEMS

- A. Exit Devices and Auxiliary Items: ANSI/BHMA A156.3.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. **Allegion plc**
 - b. **Corbin Russwin, Inc.; an ASSA ABLOY Group company**
 - c. **Falcon**
 - d. **Von Duprin**
 2. Exit Device for Exterior Gate:
 - a. Von Duprin 98/9952EO, or approved equal.
 - b. Heavy Duty, Grade-1 ANSI/BHMA Certified, Made in USA
 - c. Weather-resistant components for outdoor use.
 - d. Hardware Finish 626 Satin Chrome or 630 Satin Stainless Steel.
 - e. Exit only model, no outside trim.

2.13 LOCK CYLINDERS

- A. Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver. Provide cylinder from same manufacturer of locking devices.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. **Allegion plc**
 - b. **BEST Access Solutions, Inc.; dormakaba USA Inc.**

- c. **Corbin Russwin, Inc.; an ASSA ABLOY Group company**
- d. **Falcon**
- e. **Schlage**
- f. **Yale Security Inc; ASSA ABLOY**

- B. Standard Lock Cylinders: ANSI/BHMA A156.5, Grade 1 permanent cores; face finished to match lockset.
 - 1. Core Type: Removable.
- C. Construction Master Keys: Provide cylinders with feature that permits voiding of construction keys without cylinder removal. Provide 10 construction master keys.
- D. Construction Cores: Provide construction cores that are replaceable by permanent cores. Provide 10 construction master keys.
- E. Cylinders for Various Partitions and Doors: Key cylinders same as entrance doors of area in which partitions and door occur, except as otherwise specified. Provide cylinders to operate locking devices where specified for following partitions and doors:
 - 1. Aluminum entrance doors
 - 2. Folding doors and partitions
 - 3. Roll up doors and grilles
 - 4. Sliding doors
 - 5. Access doors where keyed lock (or cylinder lock) is indicated

2.14 KEYING

- A. Keying System: Factory registered, complying with guidelines in ANSI/BHMA A156.28, appendix. Provide one extra key blank for each lock. Incorporate decisions made in keying conference.
 - 1. Grand Master Key System: Change keys, a master key, and a grand master key operate cylinders.
 - a. Provide three cylinder change keys and five each of master and grand master keys.
 - 2. Existing System:
 - a. Master key or grand master key locks to Owner's existing system.
 - 3. Keyed Alike: Key all cylinders to same change key.
- B. Keys: Nickel silver.
 - 1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:
 - a. Notation: Information to be furnished by Owner.
 - 2. Key Quantity: Furnish 3 cut keys for each lock, 5 master keys for each master keyed group, and 5 grandmaster keys for each grandmaster system.

- a. Furnish one extra blank for each lock.

2.15 OPERATING TRIM

- A. Operating Trim: ANSI/BHMA A156.6; brass, bronze, and stainless steel unless otherwise indicated.
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. **Allegion plc**
 - b. **Ives**
 - c. **Rockwood Manufacturing Company; ASSA ABLOY Accessories and Door Controls Group, Inc.; ASSA ABLOY**
 - d. **Trimco**

2.16 ACCESSORIES FOR PAIRS OF DOORS

- A. Coordinators: ANSI/BHMA A156.3; consisting of active-leaf, hold-open lever, and inactive-leaf release trigger; fabricated from steel with nylon-coated strike plates; with built-in, adjustable safety release; and with internal override.
- B. Carry-Open Bars: ANSI/BHMA A156.3; prevent the inactive leaf from opening before the active leaf; provide polished brass or bronze carry-open bars with strike plate for inactive leaves of pairs of doors unless automatic or self-latching bolts are used.
- C. Astragals: ANSI/BHMA A156.22.

2.17 SURFACE CLOSERS

- A. Surface Closers: ANSI/BHMA A156.4, Grade 1; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written instructions for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Allegion plc
 - b. FALCON
 - c. LCN
 - d. Norton Door Controls; ASSA ABLOY
 2. Closers shall conform to the following:
 - a. The closer shall have 50 percent adjustable closing force over minimum value for that closer and have adjustable hydraulic back check effective between 60 degrees and 85 degrees of door opening.
 - b. Where specified, closer shall have hold open feature.

- c. Size Requirements: Multi-sized closers; adjustable size shall be 2 thru 6 for exterior doors, stairwell doors and doors in fire and smoke barriers, and 1 thru 4 low opening resistance for all other doors and where Barrier Free, "BF" is indicated for ADA compliance.
- d. Material of closer shall be forged or cast iron or cast aluminum.
- e. Arm and brackets for closers shall be steel, malleable iron or high strength ductile cast iron.
- f. Closers shall have full size cover.
- g. Closers shall have adjustable hydraulic back check and separate valves for closing and latching speed.

2.18 MECHANICAL STOPS AND HOLDERS

A. Wall- and Floor-Mounted Stops: ANSI/BHMA A156.16.

- 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Allegion plc
 - b. IVES
 - c. Rockwood Manufacturing Company; ASSA ABLOY Accessories and Door Controls Group, Inc.; ASSA ABLOY
 - d. Trimco
- 2. Provide door stops wherever an opened door or any item of hardware thereon would strike a wall, column, equipment or other parts of building construction. For concrete, masonry or quarry tile construction, use lead expansion shields for mounting door stops.
- 3. Wall stops shall be Type L22251 ("Ives" 408B26D or WS407CVX x US26D or "Glynn-Johnson" 50C x US26D) convex wall door stop. Where cylindrical locks with turn pieces or pushbuttons occur, equip wall bumpers Type L22251, equal to "Ives" 408-1/2B26D or WS407CCV x US26D or "Glynn-Johnson" 60C x US26D (rubber pads having concave face) to receive turn piece or button. Provide anchors as required to suit wall construction: Screw and drywall anchor at drywall / screw and expansion shield at masonry.
- 4. Substitute floor stops Type L12141 "Ives" FS436 x US26D (or GJ FB 15 x US26D) or "Ives" FS438 x US26D (or GJ FB 15/16 x US26D) as appropriate, when wall bumpers would not provide an effective door stop. (Use FS436 or GJ FB 15 for doors without threshold or undercut, and FS438 or GJ FB 15/16 for doors with threshold or undercut).
- 5. Where drywall partitions occur, use floor stops, Type L12141 as follows: Equal to: "Ives" No. FS436 x US26D or GJ FB 15 for doors without threshold or undercut, and "Ives" No. FS438 x US26D or GJ FB 15/16 for doors with threshold or undercut.
- 6. For exterior doors: Provide stop Type L12131, equal to "Ives" No. FS444 x US26D or GJ FB19X.
- 7. Omit stops where floor mounted door holders are required and where automatic operated doors occur.
- 8. Provide appropriate roller bumper for each set of doors (except where closet doors occur) where two doors would interfere with each other in swinging.
- 9. Provide appropriate door mounted stop on doors where floor or wall mounted stops cannot be used.
- 10. Provide overhead surface applied stop Type C25541, ANSI A156.8 on doors where door could come in contact with another door.
- 11. Provide door stops on doors where combination closer magnetic holders are specified.

2.19 OVERHEAD STOPS AND HOLDERS

- A. Overhead Stops and Holders: ANSI/BHMA A156.8.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. **Allegion plc**
 - b. **Glynn-Johnson**
 - c. **Rixson Specialty Door Controls; ASSA ABLOY**
 - d. **SARGENT Manufacturing Company; ASSA ABLOY**
 2. Overhead holders shall be of sizes recommended by holder manufacturer for each width of door.
 3. Set overhead holders for 110 degree opening, unless limited by building construction or equipment.

2.20 DOOR GASKETING

- A. Door Gasketing: ANSI/BHMA A156.22; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. National Guard Products, Inc
 - b. Pemko Manufacturing Company Inc.; ASSA ABLOY Accessories and Door Controls Group, Inc.; ASSA ABLOY
 - c. Reese Enterprises, Inc
- B. Maximum Air Leakage: When tested in accordance with ASTM E283/E283M with tested pressure differential of 0.3 inch wg, as follows:
1. Smoke-Rated Gasketing: 0.3 cfm/sq. ft. of door opening.
 2. Gasketing on Single Doors: 0.3 cfm/sq. ft. of door opening.
 3. Gasketing on Double Doors: 0.50 cfm per ft. of door opening.
- C. WEATHERSTRIPS (For All Exterior Doors, and other locations as indicated)
1. Heads and Jambs: Provide continuous closed cell sponge neoprene strips with beveled edge, extruded aluminum retainer with clear anodized finish, equal to "Pemko" No. 332CR, "National Guard Products Inc." No. 110NA, or "Reese" No. D69SC.
 2. Meeting Stiles of Pairs of Doors: Provide astragal equal to Provide "Pemko" No. 352CR.
 3. Raindrips: Provide and install extruded aluminum 22 mm (0.88 inch) thick raindrips with 63 mm (2-1/2 inch) projection, equal to "Pemko" No. 346C, at heads of door frames not protected by canopy or soffit. Rain drips shall be full width of door frame (outside dimension) and shall be set in bed of sealant. Remove excess sealant after installation.
 4. Door Bottoms: Provide vinyl strips with curved extruded aluminum retainer / drip with 12.7 mm (1/2") projection equal to "Pemko" No. 3452AV on all exterior doors. Set in bed of sealant. Remove excess sealant after installation.
- D. SOUND / LIGHT SEALS (For Interior Mechanical Room Doors, Darkroom Doors & as indicated)

1. Heads and Jambs: Provide sound-tested continuous extruded closed cell sponge neoprene seals with adjustable extruded aluminum retainer equal to Provide "Pemko" No. 350CSR. Neoprene insert shall be R6130 class II grade C material.
2. Meeting Stiles of Pairs of Doors: Provide astragal equal to "Pemko" No. 352CR
3. Door Bottoms: Provide sound-tested continuous extruded closed cell sponge neoprene seals with adjustable extruded aluminum retainer equal to "Pemko" No. 430CRL. Neoprene insert shall be R6130 class II grade C material.
4. Provide thresholds for all doors with sound and/or light seals: Provide "Pemko" No. 2001AS or approved equal.

E. RESILIENT SEALS (For all Fire-Rated and/or Smoke-Rated Doors)

1. Fire-rated Doors, Resilient Seals: UL10C / UBC Standard 7-2 compliant. Coordinate with selected door manufacturers' and selected frame manufacturers' requirements. Where rigid housed resilient seals are scheduled in this section and the selected door manufacturer only requires an adhesive-mounted resilient seal, furnish rigid housed seal at minimum, or both the rigid housed seal plus the adhesive applied seal. Adhesive applied seals alone are deemed insufficient for this project where rigid housed seals are scheduled.
2. UL label applied to seals on rated doors.
3. Meeting Stiles of Pairs of Fire-Rated Doors and smoke rated doors: Provide astragal equal to "Pemko" No.18061 CNB (Split Astragal) (provide one astragal on each door leaf).
 - a. Or provide "Pemko" No. 352 CR with door coordinator.

2.21 THRESHOLDS

A. Thresholds: ANSI/BHMA A156.21; fabricated to full width of opening indicated.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. National Guard Products, Inc
 - b. Pemko Manufacturing Company Inc.; ASSA ABLOY Accessories and Door Controls Group, Inc.; ASSA ABLOY
 - c. Reese Enterprises, Inc
 - d. Rixson Specialty Door Controls; ASSA ABLOY
 - e. Zero International; Allegion plc
2. Exterior Metal Thresholds: ANSI A156, 4 except as otherwise specified. All thresholds shall be extruded aluminum with mill finish. Thresholds shall be installed in a bed of sealant with machine screws and expansion shields. For sealant see Section, SEALANT AND CAULKING. Furnish thresholds where following conditions occur:
 - a. Exterior openings: Provide ADA compliant threshold: equal to "Zero" No. 566A, "Pemko" No. 2005AV, "National Guard Products Inc." No. 896, or "Reese" No. S483AV. Threshold shall be 127 mm (5 inches) wide by length of opening. Maximum height shall be 13 mm (1/2 inch). Where vertical drop or offset occurs in slab or paving under threshold, provide continuous elevator sized to suit offset.
 - b. Exterior openings having doors equipped with vertical rod type panic devices: Provide threshold similar to products listed above which is compatible with type of panic device provided. Coordinate product selection with manufacturer of panic device.

3. Interior Metal Thresholds: ANSI A156.6, Type J601, without stop (unless otherwise indicated), fabricated of extruded aluminum with mill finish. Cut thresholds to closely fit jambs. Drill and cut for door holders and bottom bolts where required. Anchor with 6 mm by 50 mm (1/4 inch by two inches), countersunk, flathead machine screws, with expansion shields, two at each end at intermediate points not over 300 mm (12 inches) on centers. For caulking of thresholds see Section, SEALANTS AND CAULKING.
 - a. Thresholds at all doors where sound seals and/or light seals are indicated, and at interior mechanical room doors: "Pemko" No. 2001AS, or approved equal.
 - b. For thresholds at elevators entrances see other sections of specifications.

2.22 METAL PROTECTIVE TRIM UNITS

- A. Metal Protective Trim Units: ANSI/BHMA A156.6; fabricated from 0.050-inch- thick brass, bronze and stainless steel; with manufacturer's standard machine or self-tapping screw fasteners.
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Allegion plc
 - b. IVES
 - c. Rockwood Manufacturing Company; ASSA ABLOY Accessories and Door Controls Group, Inc.; ASSA ABLOY
 - d. Trimco
- B. Provide protective plates and door edging as specified below:
 1. Kick mop plates and armor plates shall be stainless steel with 630 finish, equal to "H.B. Ives" Series 8400 Door Protection Plates, or "Rockwood" Doorplates.
 2. Kick mop plates for doors are listed under Article "Hardware Sets". Provide and install kick mop plate on both sides of each door leaf where kick mop plates are scheduled. Kick mop plates shall be 203 mm (8 inches) high unless otherwise indicated. On push side of doors where jamb stop extends to floor, make combination kick mop plates 38 mm (1 1/2 inches) less than width of door, except pairs of metal doors which shall have plates 25 mm (1 inch) less than width of each door. Extend all other combination kick mop plates to within 6 mm (1/4 inch) of each edge of doors. Kick mop plates shall butt astragals. For jamb stop requirements, see specification sections pertaining to door frames.
 3. Kick mop plates are not required on following door sides:
 - a. Armor plate side of doors
 - b. Exterior side of exterior doors
 - c. Closet side of closet doors
 - d. Storage side of doors to or from storage spaces
 - e. Both sides of aluminum entrance doors
 4. Armor plate for doors are listed under Article "Hardware Sets". Provide and install armor plate on both sides of each door leaf where armor plates are scheduled. Armor plates shall be 875 mm (35 inches) high and 38 mm (1 1/2 inches) less than width of doors, except on pairs of metal doors. Plates on pairs of metal doors shall be 25 mm (1 inch) less than width of each door. Where top of intermediate rail of door is less than 875 mm (35 inches) from door bottom, extend armor plates to within 13 mm (1/2 inch) of top rail. On doors equipped with panic devices, extend armor plates to within 13 mm (1/2 inch) of panic bolt cross bar.

5. Where louver or grille occurs in lower portion of doors, substitute stretcher plate and kick mop plate in place of armor plate. Size of stretcher plate and kick mop plate shall be 200 mm (8 inches) high.
6. Door edging shall be 1.3 mm (0.050 inch) thick stainless steel. Provide angles at both edges of each armor-plated wood door, except double-acting armor-plated wood doors. Install angles with 22 mm (7/8 inch) leg on push side face of door and extend the other leg full thickness of door mortised into the edge. Provide "U" shaped channels on both edges of double acting wood door. Stagger screws for securing angles and channels 400 mm (eight inches) on centers in door edges. Extend angles and channels from bottom of door to top of armor plate and cut out for bottom butt hinges and flush bolts specified for the door. Armor plates shall overlap door edging.

2.23 AUXILIARY DOOR HARDWARE

A. Auxiliary Door Hardware: ANSI/BHMA A156.16.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Allegion plc
 - b. IVES
 - c. Rockwood Manufacturing Company; ASSA ABLOY Accessories and Door Controls Group, Inc.; ASSA ABLOY
 - d. Trimco

- B. Mutes: ANSI A156.16. Provide door mutes or door silencers Type 1337A, of white or light gray color, on each steel door frame, except lead lined frames and frames for sound resistant, lightproof and electromagnetically shielded doors. Furnish 3 mutes for single doors and 2 mutes for each pair of doors, except double acting doors. Provide 4 mutes or silencers for frames for each Dutch type door. Provide 2 mutes for each edge of sliding door which would contact door frame.
- C. Provide and install astragals at meeting stiles of all pairs of fire or smoke rated doors complying with Underwriters Laboratories, Inc., requirements for fire door hardware: Provide astragal equal to "Pemko" No. 18061-CNB (provide one astragal on each door leaf).

2.24 FABRICATION

- A. Manufacturer's Nameplate: Do not provide products that have manufacturer's name or trade name displayed in a visible location except in conjunction with required fire-rating labels and as otherwise approved by Architect.
 1. Manufacturer's identification is permitted on rim of lock cylinders only.
- B. Base Metals: Produce door hardware units of base metal indicated, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and ANSI/BHMA A156.18.
- C. Fasteners: Provide door hardware manufactured to comply with published templates prepared for machine, wood, and sheet metal screws. Provide screws that comply with commercially recognized industry standards for application intended; however, aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door

hardware unless otherwise indicated.

1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
2. Fire-Rated Applications:
 - a. Wood or Machine Screws: For the following:
 - 1) Hinges mortised to doors or frames; use threaded-to-the-head wood screws for wood doors and frames.
 - 2) Strike plates to frames.
 - 3) Closers to doors and frames.
 - b. Steel Through Bolts: For the following unless door blocking is provided:
 - 1) Surface hinges to doors.
 - 2) Closers to doors and frames.
 - 3) Surface-mounted exit devices.
3. Spacers or Sex Bolts: For through bolting of hollow-metal doors.
4. Gasketing Fasteners: Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

2.25 FINISHES

- A. Provide finishes complying with ANSI/BHMA A156.18 as follows:
 1. Typical Hardware Finish (unless otherwise indicated): 626 (satin chrome US26D) or 630.
 2. Hinges (exterior doors): 630 (satin stainless steel, US32D).
 3. Hinges (interior doors): 626 (satin chrome US26D).
 4. Door Closers: 689: Factory applied paint finish. Dull or Satin Aluminum color.
 5. Thresholds: Mill finish aluminum.
 6. Other steel hardware: 652 (satin chrome-plated steel, equal to US26D).
 7. Special Finish: Exposed surfaces of hardware for dark bronze anodized aluminum doors shall have oxidized oil rubbed bronze finish (dark bronze). Finish on door closers shall closely match doors.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance of the Work.
- B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Steel Doors and Frames: For surface-applied door hardware, drill and tap doors and frames in accordance with ANSI/SDI A250.6.
- B. Wood Doors: Comply with door and hardware manufacturers' written instructions.

3.3 INSTALLATION OF DOOR HARDWARE

- A. Mounting Heights: Mount door hardware units at heights to comply with the following unless otherwise indicated or required to comply with governing regulations.
 - 1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
 - 2. Custom Steel Doors and Frames: HMMA 831.
 - 3. Wood Doors: DHI's "Recommended Locations for Architectural Hardware for Wood Flush Doors."
- B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.
 - 1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
 - 2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
- C. Hinges: Install types and in quantities indicated in door hardware schedule, but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.
- D. Lock Cylinders: Install construction cores to secure building and areas during construction period.
 - 1. Replace construction cores with permanent cores as indicated in keying schedule.
- E. Boxed Power Supplies: Locate power supplies as indicated or, if not indicated, above

accessible ceilings. Verify location with Architect.

1. Configuration: Provide one power supply for each door opening with electrified door hardware.
- F. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Section 079200 "Joint Sealants."
- G. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they will impede traffic.
- H. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
1. Do not notch perimeter gasketing to install other surface-applied hardware.
- I. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
- J. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

3.4 FIELD QUALITY CONTROL

- A. Inspection: Use hardware supplier. Include supplier's report with closeout documents.
1. Inspect door hardware and state in each report whether installed work complies with or deviates from requirements, including whether door hardware is properly installed and adjusted.

3.5 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
1. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.
 2. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
- B. Occupancy Adjustment: Approximately six months after date of Substantial Completion, Installer's Architectural Hardware Consultant is to examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors, door hardware, and electrified door hardware.

3.6 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items as necessary to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

3.7 DEMONSTRATION

- A. Demonstrate electrical, electronic and pneumatic hardware systems, including adjustment and maintenance procedures.

3.8 DOOR HARDWARE SCHEDULE

- A. The following sets of hardware correspond to hardware symbols shown on drawings. Where hardware set for a single door is specified for a pair of doors; equip each leaf of such pair of doors with set noted. It is the intent of this schedule of openings to specify necessary Finishing Hardware for each and every opening. Should any opening be omitted or any Hardware that is obviously necessary for the completion of Building, Hardware of equal quality and design as specified for a similar opening shall be used. The hardware supplier shall furnish hardware for all openings, including hardware indicated on the Drawings but not indicated in the Specifications, and vice versa. Hardware indicated on Drawings shall be considered to be part of this Hardware Schedule. No extras allowed for Hardware not covered in schedule.

- B. Door Hardware Clarification: The Contractor shall note that the HARDWARE SETS listed at the end of Section 087100 are intentionally shown in an abbreviated form. These sets show only major hardware items such as lockset function, door closer locations, etc., but do not show the specific type of hinges to use, or certain required accessory hardware items such as weatherstripping, thresholds, doorstops, etc. The requirements for these accessory hardware items as well as other hardware requirements are contained in the main body of the Door Hardware Specification under Part 2 - Products. The Contractor will be required to furnish and install thresholds, weatherstripping and drip caps on all exterior doors, door stops and silencers on all doors, and all other accessory hardware items in accordance with applicable requirements Part 2 - Products whether or not they are specifically listed in the "HARDWARE SETS".

1. Hardware Set H-1 (For Aluminum Entrance Doors): Each door to have the following:

- a. 1 OR 2 Rim or mortise cylinders as required; Masterkeyed as directed.
- b. 1 EA Security Floor Stop (IVES No. FS18S – BLK)
- c. Other hardware by door supplier.

2. Hardware Set H-2

- a. Hinges as required
- b. Lock F82 (Entrance or Office Lock Function)

3. Hardware Set H-3

- a. Hinges as required
- b. Lock F86 (Storeroom or Closet Lock Function)

4. Hardware Set H-4

- a. Hinges as required
- b. Lock F86 (Storeroom or Closet Lock Function)
- c. Closer-1: Norton 8501
- d. 1 set fire/smoke seals Pemko HSS2000 X S88BL
- e. Threshold

5. Hardware Set H-5

- a. Hinges as required
 - b. Lock F76 (Privacy, Bedroom or Bath Lock Function)
 - c. Provide type which can be opened from outside w/ small screwdriver, not requiring special emergency key
6. Hardware Set H-6
- a. Hinges as required
 - b. Latch F75 (Passage Set)
7. Hardware Set H-7
- a. Hinges as required
 - b. Lock F82 (Entry Lock)
 - c. 1 Overhead Holder
 - d. 1 set weatherstrip
 - e. Threshold
 - f. Top and bottom rain drips
8. Hardware Set H-8
- a. Hinges as required
 - b. ASSA ABLOY ACCENTRA nexTouch Cylindrical Keypad Lock with (inside and outside) lever handles, or equal.
 - c. Closer-5: Norton 8501
 - d. 1 set weatherstrip
 - e. Threshold
9. Hardware Set H-9
- a. padlock, exterior grade, masterkeyed as directed
 - b. Other hardware by gate supplier.
10. Hardware Set H-10 - TYPICAL CABINET HARDWARE; UNLESS OTHERWISE NOTED, ALL CABINETWORK SHALL HAVE THE FOLLOWING HARDWARE:
- a. 1 "Epco" # 1009T magnetic catch for each door 3'-0" or less in height.
 - b. 2 "Epco" # 592 catches for each door greater than 3'-0" high.
 - c. 1 "Stanley" or "Epco" #4483 1/2 26D pull each drawer and each door.
 - d. 1 set KV1300 slides each drawer
 - e. 1 02066 X 26D Cylinder locks (on each drawer where indicated), (masterkeyed)
 - f. 1 CCL 02067 X 26D Cylinder locks (on cabinet doors where indicated), (masterkeyed)
 - g. 1 2A92 elbow catch at each inactive leaf on each pair of doors where lock is indicated (Provide 2 chrome plated slide bolts per door if door is over 60" tall).
 - h. 1 pair "Stanley" 1592-26D hinges for each 3/4" thick door 3' 0" or less in height (double dap doors)
 - i. 1-1/2 pair "Stanley" 1592-26D hinges for each 3/4" thick door more than 36" in height (double dap doors)
 - j. 1-1/2 pair "Stanley" 1589-26D hinges for each 1-3/8" thick cabinet door.
 - k. 4 5mm chrome plated steel shelf clips each shelf
 - l. Hanging rods (clothes rods) shall be KV2.
 - m. 1 KV476 (Letter) "file follower" at each file drawer.
 - n. Hardware Finish: All hardware shall be US26D (satin chrome) unless otherwise noted.

11. Hardware Set H-11 (For double-acting gate at reception counter)
 - a. Bommer 7200 series x 26D Spring Pivot Set (with top pivot & bottom spring pivot)
 - b. Rockwood # 592 x 26D heavy-duty adjustable Roller Latch with special double-acting strike
12. Hardware Set H-12 ("Buzz-In" Access Control and Self-Closing Hinges at Gate 21)
 - a. Heavy-Duty Self-Closing Gate Hinge Set, "LOCINOX" "MAMMOTH-HD-USA"
 - b. ASSA ABLOY ACCENTRA nexTouch Cylindrical Keypad Lock, or equal.
 - c. 1 EA Electric Strike, ASSA ABLOY HES 5000C with 501 faceplate.
 - d. 1 EA. POWER SUPPLY (voltage as required to be compatible with electric strike) and concealed low voltage wiring and conduit from gate to reception desk.
 - e. 1 EA. REMOTE PUSH BUTTON 660-T4 SCHLAGE or ALARM CONTROLS TS-18 located under Reception counter
 - f. Gate shall always provide free mechanical egress.
 - g. Gate to remain locked from outside during business hours. Activating the push button remotely from Reception area will retract the electric latch and unlock the gate momentarily. The gate will relock upon closing.
 - h. Provide 24" high x 16 gauge security shield/mounting plate pre-drilled to suit hardware.
 - i. Other hardware by gate Supplier.
13. Hardware Set H-13 (Panic Hardware / Exit Device and Self-Closing Hinges at Gate 22)
 - a. Heavy-Duty Self-Closing Gate Hinge Set, "LOCINOX" "MAMMOTH-HD-USA"
 - b. Von Duprin 98/9952EO x 626 or 630, or DAC Industries D-6000 panic bar (or equal) heavy-duty weather-resistant exit device. Exit only model, no outside trim.
 - c. Latchbolt: Deadlatching, 3/4" throw.
 - d. Strike: 699 Roller Strike.
 - e. Gate shall always provide free mechanical egress.
 - f. Gate always locked from outside. The gate shall relock upon closing.
 - g. Gate shall always provide free mechanical egress.
 - h. Provide 24" high x 16 gauge panic shield security mounting plate pre-drilled to suit hardware: DAC Industries, Inc. D-6030 Standard Kit, which shall include the parts necessary to surface mount a D-6000 panic bar to a chain link gate.
 - i. Other hardware by gate Supplier.
14. Hardware Set H-14 (For Sliding Gates): Each gate to have the following:
 - a. 1 OR 2 Rim or mortise cylinders as required; Masterkeyed as directed.
 - b. Other hardware by gate supplier.

END OF SECTION 087100

DIVISION 8 - OPENINGS
SECTION 088000 - GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes:
 - 1. Glass for windows, doors, interior borrowed lites, storefront framing, glazed curtain walls.
 - 2. Glazing sealants and accessories.

1.3 DEFINITIONS

- A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.
- B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.
- C. IBC: International Building Code.
- D. Interspace: Space between lites of an insulating-glass unit.

1.4 COORDINATION

- A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.
- B. Product Data: For each type of product.
- C. Glass Samples: For each type of the following products; **12 inches** square.
 - 1. Clear
 - 2. Tinted glass.
 - 3. Coated glass.
 - 4. Tempered glass.
 - 5. Insulating glass.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer manufacturers of insulating-glass units with sputter-coated, low-E coatings and.
- B. Product Certificates: For glass.
- C. Sample Warranties: For special warranties.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved and certified by coated-glass manufacturer.
- B. Installer Qualifications: Engage an experienced glazier who has completed glazing similar in material, design, and extent to that indicated for Project with a record of successful in-service performance.
- C. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
- D. Comply with insulating-glass manufacturer's written instructions for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.
 - 1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or are below **40 deg F**.

1.8 WARRANTY

- A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.
 - 1. Warranty Period: 10 years from date of Substantial Completion.
- B. Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace

insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide one of the following:
 1. Vitro Architectural Glass
 2. AGC Glass Company North America, Inc.; Solar Control Low-E – ENERGY SELECT™ 23.
 3. Cardinal Glass Industries.
 4. GGI; General Glass International.
 5. Guardian Glass; SunGuard.
- B. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type.
 1. Obtain tinted glass from single source from single manufacturer.
 2. Obtain reflective-coated glass from single source from single manufacturer.
- C. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

2.2 PERFORMANCE REQUIREMENTS

- A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.
- C. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
 1. For monolithic-glass lites, properties are based on units with lites 6 mm thick.
 2. For laminated-glass lites, properties are based on products of construction indicated.
 3. For insulating-glass units, properties are based on units of thickness indicated for

- overall unit and for each lite.
4. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as **Btu/sq. ft. x h x deg F.**
 5. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
 6. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.3 GLASS PRODUCTS, GENERAL

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.
1. AAMA Publications and Standards
 2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."
- B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.
- D. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than the thickness indicated.
1. Minimum Glass Thickness for Exterior Lites: 6 mm.
 2. Thickness of Tinted Glass: Provide same thickness for each tint color indicated throughout Project.
- E. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where fully tempered float glass is indicated, provide fully tempered float glass.

2.4 GLASS PRODUCTS

- A. Clear Annealed Float Glass: ASTM C 1036, Type I, Class 1 (clear), Quality-Q3.
- B. Tinted Annealed Float Glass: ASTM C 1036, Type I, Class 2 (tinted), Quality-Q3.
- C. Fully Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.

1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
- D. Heat-Strengthened Float Glass: ASTM C 1048, Kind HS (heat strengthened), Type I, Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
 1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
- E. Ceramic-Coated Spandrel Glass: ASTM C 1048, Type I, Condition B, Quality-Q3.

2.5 INSULATING GLASS

- A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190.
 1. Sealing System: Dual seal, with polyisobutylene and polysulfide polyisobutylene and silicone polyisobutylene and hot-melt butyl polyisobutylene and polyurethane primary and secondary sealants.
 2. Perimeter Spacer: Manufacturer's standard spacer material and construction Aluminum with mill or clear anodic finish.
 3. Desiccant: Molecular sieve or silica gel, or a blend of both.

2.6 GLAZING SEALANTS

- A. General:
 1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
 2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
 3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.
- B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Dow Corning Corporation
 - b. GE Construction Sealants; Momentive Performance Materials Inc.
 - c. Pecora Corporation.
 - d. Sika Corporation.
 - e. Tremco Incorporated.

2. Applications:
3. Perimeter of aluminum framing abutting adjacent material
4. Other applications and locations as recommended by manufacturer of glazing materials and framing systems.

2.7 GLAZING TAPES

- A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:
 1. AAMA 804.3 tape, where indicated.
 2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
 3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

2.8 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, with requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

2.9 FABRICATION OF GLAZING UNITS

- A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
 - a. Temperature Change: **120 deg F**, ambient; **180 deg F**, material surfaces.
- B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.
- C. Grind smooth and polish exposed glass edges and corners.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:
 1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
 2. Presence and functioning of weep systems.
 3. Minimum required face and edge clearances.
 4. Effective sealing between joints of glass-framing members.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.
- B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.
- C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing

publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

- E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- F. Provide spacers for glass lites where length plus width is larger than **50 inches**.
 - 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
 - 2. Provide **1/8-inch** minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
- H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- I. Set glass lites with proper orientation so that coatings face exterior or interior as specified.
- J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.4 TAPE GLAZING

- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Do not remove release paper from tape until right before each glazing unit is installed.

- F. Apply heel bead of elastomeric sealant.
- G. Center glass lites in openings on setting blocks, and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

- A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- E. Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)

- A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.7 CLEANING AND PROTECTION

- A. Immediately after installation remove nonpermanent labels and clean surfaces.

- B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.
 - 1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.
- C. Remove and replace glass that is damaged during construction period.
- D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

3.8 INSULATING GLASS SCHEDULE

- A. Glass Type 1: 1-inch thick Insulating Glass, Low E, Tinted Units
 - 1. Basis-of-Design Product: Vitro Glass, Solarban 60 or Solarban 70 XL.
 - 2. Overall Unit Thickness: 1 Inch .
 - 3. Minimum Thickness of Each Glass Lite: 6 mm
 - 4. Outdoor Lite: Annealed float glass tinted. Tint selected by Architect from Manufacturer's full range of available choices.
 - 5. Interspace Content: Air
 - 6. Indoor Lite: Annealed float clear glass.
 - 7. Low-E Coating: magnetic sputter vacuum deposition on second surface.
 - 8. Winter Nighttime U-Factor: 0.28 maximum.
 - 9. Summer Daytime U-Factor: 0.26 maximum.
 - 10. Solar Heat Gain Coefficient: 0.27 maximum.
 - 11. Visible Light Transmittance: As determined from selection of Tint Color.
- B. Glass Type 2: 1-inch thick Insulating Glass, Low E, Tinted, Tempered
 - 1. Basis-of-Design Product: Vitro Glass, Solarban 60 or Solarban 70 XL.
 - 2. Overall Unit Thickness: 1 Inch .
 - 3. Minimum Thickness of Each Glass Lite: 6 mm
 - 4. Outdoor Lite: Fully tempered float glass tinted. Tint selected by Architect from Manufacturer's full range of available choices.
 - 5. Interspace Content: Air
 - 6. Indoor Lite: Fully tempered float clear glass.
 - 7. Low-E Coating: magnetic sputter vacuum deposition on second surface.
 - 8. Winter Nighttime U-Factor: 0.28 maximum.
 - 9. Summer Daytime U-Factor: 0.26 maximum.
 - 10. Solar Heat Gain Coefficient: 0.27 maximum.
 - 11. Visible Light Transmittance: As determined from selection of Tint Color
 - 12. Safety glazing required.

3.9 MONOLITHIC GLASS SCHEDULE

- A. Glass Type 5: 1/4-Inch-Thick Clear Annealed Float Glass.
 - 1. Minimum Thickness: 6 mm.
- B. Glass Type 6: 1/4-Inch-Thick Clear Fully Tempered Float Glass.
 - 1. Minimum Thickness: 6 mm.
 - 2. Safety glazing required
- C. Glass Type 7: 1/4 Inch Thick Fire Rated Wire Glass:
- D. Refer to Specifications Section 08 81 17 Fire Rated Wire Glass for material, type and installation.

END OF SECTION 088000

DIVISION 8 - OPENINGS
SECTION 089119 - FIXED LOUVERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Fixed extruded-aluminum louvers.

1.3 DEFINITIONS

- A. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section unless otherwise defined in this Section or in referenced standards.
- B. Horizontal Louver: Louver with horizontal blades (i.e., the axis of the blades are horizontal).
- C. Drainable-Blade Louver: Louver with blades having gutters that collect water and drain it to channels in jambs and mullions, which carry it to bottom of unit and away from opening.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. For louvers specified to bear AMCA seal, include printed catalog pages showing specified models with appropriate AMCA Certified Ratings Seals.
- B. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other work. Show frame profiles and blade profiles, angles, and spacing.
 - 1. Show weep paths, gaskets, flashings, sealants, and other means of preventing water intrusion.
 - 2. Show mullion profiles and locations.

1.5 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: Based on evaluation of comprehensive tests performed according to AMCA 500-L by a qualified testing agency or by manufacturer and witnessed by a qualified testing agency, for each type of louver and showing compliance with performance requirements specified.

1.6 FIELD CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.7 WARRANTY

- A. Special Finish Warranty: Manufacturer agrees to repair or replace components on which finishes fail in materials or workmanship within specified warranty period.
 - 1. Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain fixed louvers from single source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.

2.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Louvers shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver-blade rattle or flutter, or permanent damage to fasteners and anchors. Wind pressures shall be considered to act normal to the face of the building.
 - 1. Wind Loads: Determine loads based on a uniform pressure of 35 lbf/sq. ft., acting inward or outward.
- B. Louver Performance Ratings: Provide louvers complying with requirements specified, as demonstrated by testing manufacturer's stock units identical to those provided, except for length and width according to AMCA 500-L.
- C. SMACNA Standard: Comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" for fabrication, construction details, and installation procedures.

2.3 FIXED EXTRUDED-ALUMINUM LOUVERS

- A. Horizontal Drainable-Blade Louver :
 - 1. Basis of Design Product: Subject to compliance with requirements, provide Ruskin ELT, Wind-Driven Rain Resistant Stationary Louver or comparable product by one of the following:

- a. Airolite Company, LLC . Basis of Design K605 Sight proof, drainable louver.
 - b. Construction Specialties, Inc.
 - c. Ruskin Company.
2. Louver Depth: 4inches.
3. Frame and Blade Nominal Thickness: Not less than 0.060 inch for blades and 0.081 inch for frames.
4. Shapes and Sizes: Rectangular and/or Triangular shapes and sizes as indicated on Drawings.
5. Mullion Type: Exposed.
6. Louver Performance Ratings:
 - a. Free Area: Not less than 7.59 sq. ft. for 48-inch- wide by 48-inch- high louver.
 - b. Point of Beginning Water Penetration: Not less than 1,250 fpm.

2.4 LOUVER SCREENS

- A. General: Provide screen at each exterior louver.
 1. Screen Location for Fixed Louvers: Interior face.
 2. Screening Type: Bird screening.
- B. Secure screen frames to louver frames with machine screws with heads finished to match louver, spaced a maximum of 6 inches from each corner and at 12 inches o.c.
- C. Louver Screen Frames: Fabricate with mitered corners to louver sizes indicated.
 1. Metal: Same type and form of metal as indicated for louver to which screens are attached. Reinforce extruded-aluminum screen frames at corners with clips.
 2. Finish: Same finish as louver frames to which louver screens are attached.
 3. Type: Non-rewirable, U-shaped frames.
- D. Louver Screening for Aluminum Louvers:
 1. Bird Screening: Aluminum, 1/2-inch- square mesh, 0.063-inch wire.

2.5 BLANK-OFF PANELS

- A. Uninsulated Blank-Off Panels: Metal sheet attached to back of louver.
 1. Aluminum sheet for aluminum louvers, not less than 0.050-inch nominal thickness.
 2. Panel Finish: Same finish applied to louvers.
 3. Attach blank-off panels with clips.

2.6 MATERIALS

- A. Aluminum Extrusions: ASTM B 221, Alloy 6063-T5, T-52, or T6.
- B. Aluminum Sheet: ASTM B 209, Alloy 3003 or 5005, with temper as required for forming, or as otherwise recommended by metal producer for required finish.
- C. Fasteners: Use types and sizes to suit unit installation conditions.

1. Use Phillips flat-head screws for exposed fasteners unless otherwise indicated.
 2. For fastening aluminum, use aluminum or 300 series stainless-steel fasteners.
 3. For color-finished louvers, use fasteners with heads that match color of louvers.
- D. Post installed Fasteners for Concrete and Masonry: Torque-controlled expansion anchors, fabricated from stainless-steel components, with allowable load or strength design capacities calculated according to ICC-ES AC193 and ACI 318 greater than or equal to the design load, as determined by testing according to ASTM E 488/E 488M conducted by a qualified testing agency.
- E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.

2.7 FABRICATION

- A. Factory assemble louvers to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- B. Vertical Assemblies: Where height of louver units exceeds fabrication and handling limitations, fabricate units to permit field-bolted assembly with close-fitting joints in jambs and mullions, reinforced with splice plates.
1. Continuous Vertical Assemblies: Fabricate units without interrupting blade-spacing pattern unless horizontal mullions are indicated.
- C. Maintain equal louver blade spacing, including separation between blades and frames at head and sill, to produce uniform appearance.
- D. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.
1. Frame Type: Channel unless otherwise indicated.
- E. Include supports, anchorages, and accessories required for complete assembly.
- F. Provide vertical mullions of type and at spacings indicated, but not more than is recommended by manufacturer, or 72 inches o.c., whichever is less.
1. Exposed Mullions: Where indicated, provide units with exposed mullions of same width and depth as louver frame. Where length of louver exceeds fabrication and handling limitations, provide interlocking split mullions designed to permit expansion and contraction.
 2. Exterior Corners: Prefabricated corner units with mitered and welded blades blades with concealed close-fitting splices and with mullions at corners.
- G. Provide subsills made of same material as louvers for recessed louvers.
- H. Join frame members to each other and to fixed louver blades with fillet welds , threaded fasteners, or both, as standard with louver manufacturer unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

2.8 ALUMINUM FINISHES

- A. Finish louvers after assembly.
- B. High-Performance Organic Finish: Two-coat fluoropolymer finish complying with AAMA 2604 and containing not less than 50 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 1. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and openings, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.3 INSTALLATION

- A. Locate and place louvers level, plumb, and at indicated alignment with adjacent work.
- B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.
- C. Form closely fitted joints with exposed connections accurately located and secured.
- D. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.
- E. Protect unpainted galvanized- and nonferrous-metal surfaces that are in contact with concrete, masonry, or dissimilar metals from corrosion and galvanic action by applying a heavy coating of bituminous paint or by separating surfaces with waterproof gaskets or nonmetallic flashing.
- F. Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses, where weathertight louver joints are required. Comply with Section 079200 "Joint Sealants" for sealants applied during louver installation.

3.4 ADJUSTING AND CLEANING

- A. Clean exposed louver surfaces that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate during construction period.

- B. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.
- C. Restore louvers damaged during installation and construction, so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.
 - 1. Touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

END OF SECTION 089119

DIVISION 9 - FINISHES

SECTION 092900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior gypsum board.
2. Tile backing panels.
3. Trim accessories.
4. Texture finishes.

B. Related Requirements:

1. Section 079219 "Acoustical Joint Sealants" for acoustical joint sealants installed in gypsum board assemblies.
2. Section 092216 "Non-Structural Metal Framing" for nonstructural steel framing and suspension systems that support gypsum board panels.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples for Initial Selection:

1. Texture Finish: For each type required.

C. Samples for Verification: Actual sample of finished products for the following:

1. Textured Finishes: 2 ft. x 2 ft. for each textured finish required and on same backing indicated for Work.

1.3 MOCKUPS

A. Build mockups of at least 100 sq. ft. (9 sq. m) in surface area to demonstrate aesthetic effects and to set quality standards for materials and execution.

1. Build mockups for the following:

- a. Each level of gypsum board finish required for use in exposed locations.
- b. Each texture finish required.
2. Apply or install final decoration required, including painting and wallcoverings, on exposed surfaces for review of mockups.
3. Simulate finished lighting conditions for review of mockups.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.5 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C840 requirements or manufacturer's written instructions, whichever are more stringent.
- B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.
- C. Do not install panels that are wet, moisture damaged, or mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Obtain each type of gypsum panel and joint finishing material from single source with resources to provide products of consistent quality in appearance and physical properties.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated on Drawings in accordance with ASTM E119; tested by a qualified testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated on Drawings in accordance with ASTM E90 and classified in accordance with ASTM E413; tested by a qualified testing agency.

2.3 GYPSUM BOARD, GENERAL

- A. Size: Provide panel products in maximum lengths and widths available that will minimize joints in each area and that correspond with support system specified or indicated on Drawings.

2.4 INTERIOR GYPSUM BOARD

- A. Gypsum Wallboard: ASTM C1396/C1396M.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. CertainTeed; SAINT-GOBAIN
 - b. Georgia-Pacific Gypsum LLC
 - c. Gold Bond Building Products, LLC provided by National Gypsum Company
 - d. USG Corporation
- B. Gypsum Board, Type X: ASTM C1396/C1396M.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. CertainTeed; SAINT-GOBAIN
 - b. Georgia-Pacific Gypsum LLC
 - c. Gold Bond Building Products, LLC provided by National Gypsum Company
 - d. USG Corporation
 - 2. Thickness: 5/8 inch (15.9 mm).
 - 3. Long Edges: Tapered for prefilling.
- C. Gypsum Board, Type C: ASTM C1396/C1396M; manufactured to have increased fire-resistive capability.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. **CertainTeed; SAINT-GOBAIN**
 - b. **Georgia-Pacific Gypsum LLC**
 - c. **Gold Bond Building Products, LLC provided by National Gypsum Company**
 - d. **USG Corporation**
 - 2. Thickness: As required by fire-resistance-rated assembly indicated on Drawings.
 - 3. Mold Resistance: ASTM D3273, score of 10 as rated in accordance with ASTM D3274.
 - 4. Long Edges: Tapered.
- D. Flexible Gypsum Board: ASTM C1396/C1396M; manufactured to bend to fit radii and to be more flexible than standard regular-type gypsum board of same thickness.
 - 1. Core: As indicated on Drawings; Type C as required by fire-resistance-rated assembly on Drawings; with ASTM D3273 mold resistance score of 10 rated in accordance with ASTM D3274] <Insert requirements.
 - 2. Long Edges: Tapered.
- E. Gypsum Ceiling Board: ASTM C1396/C1396M.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. CertainTeed; SAINT-GOBAIN
 - b. Georgia-Pacific Gypsum LLC
 - c. Gold Bond Building Products, LLC provided by National Gypsum Company
 - d. USG Corporation
- F. Abuse-Resistant/ Impact-Resistant Gypsum Board Gypsum Board: ASTM C1396/C1396M, tested in accordance with ASTM C1629/C1629M.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. CertainTeed; SAINT-GOBAIN
 - b. Georgia-Pacific Gypsum LLC
 - c. Gold Bond Building Products, LLC provided by National Gypsum Company
 - d. USG Corporation
2. Basis-of-Design Product: Subject to compliance with requirements, provide USG "Fiberock" Brand "VHI" (Very High Impact); or, National Gypsum Company Hi-Impact XP Wallboard Abuse and Impact-Resistant Gypsum Fiber Panel or comparable product by one of the following:
 - a. CertainTeed; SAINT-GOBAIN
 - b. Georgia-Pacific Gypsum LLC
 - c. Gold Bond Building Products, LLC provided by National Gypsum Company
 - d. USG Corporation
3. Core: 5/8 inch (15.9 mm), Type X.
4. Surface Abrasion: ASTM C1629/C1629M, meets or exceeds Level 1 requirements.
5. Indentation: ASTM C1629/C1629M, meets or exceeds Level 1 requirements.
6. Soft-Body Impact: ASTM C1629/C1629M, meets or exceeds Level 2 requirements.
7. Mold Resistance: ASTM D3273, score of 10 as rated in accordance with ASTM D3274.
8. Long Edges: Tapered.

G. Mold-Resistant Gypsum Board: ASTM C1396/C1396M; manufactured with moisture- and mold-resistant core and paper surfaces.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. CertainTeed; SAINT-GOBAIN
 - b. Georgia-Pacific Gypsum LLC
 - c. Gold Bond Building Products, LLC provided by National Gypsum Company
 - d. USG Corporation
2. Core: 5/8 inch (15.9 mm), Type X or 5/8 inch (15.9 mm), Type C as required by fire-resistance-rated assembly indicated on Drawings.
3. Mold Resistance: ASTM D3273, score of 10 as rated in accordance with ASTM D3274.
4. Long Edges: Tapered.

2.5 TILE BACKING PANELS

A. Cementitious Backer Units: ANSI A118.9 and ASTM C1288 or ASTM C1325, with manufacturer's standard edges.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. James Hardie Building Products, Inc.
 - b. PermaBASE Building Products, LLC provided by National Gypsum Company
 - c. USG Corporation

2. Thickness: 5/8 inch (15.9 mm).
3. Mold Resistance: ASTM D3273, score of 10 as rated in accordance with ASTM D3274.

B. Water-Resistant Gypsum Backing Board: ASTM C1396/C1396M, with manufacturer's standard edges.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. CertainTeed; SAINT-GOBAIN
 - b. Gold Bond Building Products, LLC provided by National Gypsum Company
2. Core: 5/8 inch (15.9 mm), Type X.

2.6 TRIM ACCESSORIES

A. Interior Trim: ASTM C1047.

1. Material: Galvanized-steel sheet or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized-steel sheet.
2. Shapes:
 - a. Cornerbead.
 - b. Bullnose bead.
 - c. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - d. L-Bead: L-shaped; exposed long flange receives joint compound.
 - e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
 - f. Expansion (control) joint.
 - g. Curved-Edge Cornerbead: With notched or flexible flanges.

B. Aluminum Trim: Extruded accessories of profiles and dimensions indicated on Drawings.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Fry Reglet Corporation
 - b. Gordon Inc.
2. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B221 (ASTM B221M), Alloy 6063-T5.
3. Finish: Corrosion-resistant primer compatible with joint compound and finish materials specified.
4. Class II, Clear Anodic Finish: AA-C12C22A31 (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, clear coating with a minimum thickness of 0.01 mm).

2.7 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C475/C475M requirements.

1. Mold-Resistant Joint Compound: Use mold-resistant formulations with mold-resistant

panel products.

B. Joint Tape:

1. Interior Gypsum Board: Paper.
2. Exterior Gypsum Soffit Board: Paper.
3. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.
4. Tile Backing Panels: As recommended in writing by panel manufacturer.

C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
 - a. Use setting-type compound for installing paper-faced metal trim accessories.
3. Fill Coat: For second coat, use drying-type, sandable topping compound.
4. Finish Coat: For third coat, use drying-type, sandable topping compound.
5. Skim Coat: For final coat of Level 5 finish, use drying-type, sandable topping compound.

D. Joint Compound for Tile Backing Panels:

1. Glass-Mat, Water-Resistant Backing Panel: As recommended in writing by backing panel manufacturer.
2. Cementitious Backer Units: As recommended in writing by backer unit manufacturer.
3. Water-Resistant Gypsum Backing Board: Use setting-type taping compound and setting-type, sandable topping compound.

2.8 AUXILIARY MATERIALS

A. Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.

B. Laminating Adhesive: Adhesive or joint compound recommended in writing by manufacturer for directly adhering gypsum panels to continuous substrate.

C. Steel Drill Screws: ASTM C1002 unless otherwise specified or indicated on Drawings.

1. Use screws complying with ASTM C954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.
2. For fastening cementitious backer units, use screws of type and size recommended in writing by panel manufacturer.

D. Sound-Attenuation Blankets: ASTM C665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers as follows:

1. Non-Fire-Resistance-Rated Assemblies: Glass or slag or rock wool.
2. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.

E. Acoustical Sealant: As specified in Section 079219 "Acoustical Joint Sealants."

- F. Thermal Insulation: As specified in Section 072100 "Thermal Insulation."
- G. Vapor Retarder: As specified in Section 072600 "Vapor Retarders."

2.9 TEXTURE FINISHES

- A. Primer: As recommended in writing by textured finish manufacturer.
- B. Aggregate Job-Mixed Finish: Water-based, drying-type texture finish for spray application.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. CertainTeed; SAINT-GOBAIN
 - b. ProForm Finishing Products, LLC provided by National Gypsum Company
 - c. USG Corporation
 - 2. Texture: Light spatter.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION AND FINISHING OF PANELS, GENERAL

- A. Comply with ASTM C840 requirements.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.6 mm) of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings,

etc.), except in chases braced internally.

1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. (0.7 sq. m) in area.
 2. Fit gypsum panels around ducts, pipes, and conduits.
 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- (6.4- to 9.5-mm-) wide joints to install sealant.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- I. Wood Framing: Install gypsum panels over wood framing, with floating internal corner construction. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members or provide control joints to counteract wood shrinkage.
- J. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C919 requirements and with manufacturer's written instructions for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.
- K. Install sound-attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 INSTALLATION OF INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
1. Gypsum Wallboard: As indicated on Drawings.
 2. Gypsum Board, Type X: Where required for fire-resistance-rated assembly.
 3. Gypsum Board, Type C: Where required for specific fire-resistance-rated assembly indicated.
 4. Flexible Gypsum Board: Apply in double layer at curved assemblies.
 5. Gypsum Ceiling Board: Ceiling surfaces.
 6. Abuse-Resistant Gypsum Board: As indicated on Drawings.
 7. Impact-Resistant Gypsum Board: As indicated on Drawings.
 8. Mold-Resistant Gypsum Board: As indicated on Drawings.
- B. Single-Layer Application:
1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated on Drawings.
 2. On partitions/walls, apply gypsum panels horizontally (perpendicular to framing) unless otherwise specified or indicated on Drawings or required by fire-resistance-rated assembly, and minimize end joints.

- a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
 3. On Z-shaped furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
 4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.
 - C. Multilayer Application:
 1. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over studs or furring members and face-layer joints offset at least one stud or furring member with base-layer joints unless otherwise indicated on Drawings or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
 2. On Z-shaped furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
 3. Fastening Methods: Fasten base layers and face layers separately to supports with screws.
 - D. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written instructions and temporarily brace or fasten gypsum panels until fastening adhesive has set.
 - E. Curved Surfaces:
 1. Install panels horizontally (perpendicular to supports) and unbroken, to extent possible, across curved surface plus 12-inch- (305-mm-) long straight sections at ends of curves and tangent to them.
 2. For double-layer construction, fasten base layer to studs with screws 16 inches (406 mm) o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 12 inches (305 mm) o.c.
- 3.4 INSTALLATION OF TILE BACKING PANELS
- A. Cementitious Backer Units: ANSI A108.11, at locations indicated to receive tile.
 - B. Water-Resistant Backing Board: Install where indicated with 1/4-inch (6.4-mm) gap where panels abut other construction or penetrations.
- 3.5 INSTALLATION OF TRIM ACCESSORIES
- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim in accordance with manufacturer's written instructions.
 - B. Control Joints: Install control joints at locations indicated on Drawings and in accordance with ASTM C840 and as follows:
 1. Locate at both side jambs of all openings. Use one system throughout.
 2. Locate at 30 feet maximum on center each way in partitions, walls and wall furring.
 3. Locate at 30 feet maximum on center each way in gypsum board ceilings.

4. Locate where ceiling framing or furring changes direction.
5. Locate where expansion and control joints occur in base wall or slab.
6. Extend control joints the full height of the wall or length of soffit/ceiling membrane.
7. Control joints in fire-rated partitions shall be fire-rated control joints constructed as follows: Provide one stud on each side of joint with fire-rated filler inside wall cavity consisting of either U.L. rated fire-stop safing insulation contained by two (2) studs, or two (2) layers 5/8" U.L. rated gypsum board screw-attached to web of stud on one side of control joint. Con-form to fire-rated control joint details as indicated in the latest edition of the "Gypsum Construction Handbook" by the United States Gypsum Company.

C. Interior Trim: Install in the following locations:

1. Cornerbead: Install at outside corners.
2. Bullnose Bead: Install where indicated on Drawings.
3. LC-Bead: Install at exposed panel edges.
4. L-Bead: Install where indicated on Drawings.
5. U-Bead: Install where indicated on Drawings.
6. Curved-Edge Cornerbead: Install at curved openings.

D. Aluminum Trim: Install in locations indicated on Drawings.

3.6 APPLICATION OF JOINT TREATMENT MATERIALS

- A. Finishing Panel Products: Treat joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare panel surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints, rounded or beveled edges, and damaged surface areas.
- C. Apply joint tape over panel joints, except for trim products specifically indicated as not intended to receive tape.
- D. Interior Gypsum Board: Finish panels to levels indicated below and in accordance with ASTM C840:
1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 2. Level 2: Panels that are substrate for tile, F.R.P. panels and where indicated on Drawings.
 3. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.
 - a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."
 4. Level 5: for gypsum board surfaces receiving epoxy paint, gloss enamels and where indicated.
 - a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."
 5. Apply spray-textured finish to all gypsum board ceilings. (Prepare surface as in Level 4 prior to spray-texturing).
- E. Cementitious Backer Units: Finish in accordance with manufacturer's written instructions.

3.7 APPLICATION OF TEXTURE FINISHES

- A. Surface Preparation and Primer: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes. Apply primer to surfaces that are clean, dry, and smooth.
- B. Texture Finish Application: Mix and apply finish using powered spray equipment, to produce a uniform texture matching approved mockup and free of starved spots or other evidence of thin application or of application patterns.
- C. Prevent texture finishes from contacting surfaces not indicated to receive texture finish by covering them with masking agents, polyethylene film, or other means. If, despite these precautions, texture finishes contact these surfaces, immediately remove droppings and overspray to prevent damage in accordance with texture-finish manufacturer's written instructions.

3.8 PROTECTION

- A. Protect adjacent surfaces from joint compound and promptly remove from floors and other non-gypsum board surfaces. Repair surfaces stained, marred, or otherwise damaged during gypsum board installation and finishing.
- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 092900

DIVISION 9 – FINISHES

SECTION 093014 - PORCELAIN TILE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Porcelain tile.
 - 2. Thresholds.
 - 3. Waterproof membranes.
 - 4. Setting material.
 - 5. Grout materials.

1.2 DEFINITIONS

- A. General: Definitions in ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.
- B. Face Size: Actual tile size, excluding spacer lugs.
- C. Module Size: Actual tile size plus joint width indicated.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples for Initial Selection: For tile, grout, and accessories involving color selection or shade variation.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.
- C. Product Certificates: For each type of product, including product use classification.
- D. Product Test Reports:
 - 1. Tile-setting and -grouting products.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Extra Stock Material: Furnish extra materials, from the same production run, to Owner that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications:
 - 1. Installer is a Five-Star member of the National Tile Contractors Association or a Trowel of Excellence member of the Tile Contractors' Association of America.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.
- B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.
- D. Store liquid materials in unopened containers and protected from freezing.

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Tile: Obtain tile of each type and color or finish from single source or producer.
 - 1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.
- B. Accessory Products: Obtain each of the following products specified in this Section from a single manufacturer:
 - 1. Stone thresholds.

2.2 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
 - 1. Provide tile complying with Standard Grade requirements unless otherwise indicated.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.
- C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

2.3 PORCELAIN TILE

- A. Porcelain Tile Type: Unglazed.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. **American Olean; a brand of Dal-Tile Corporation**
 - b. **Crossville, Inc.**
 - c. **Daltile; a brand of Dal-Tile Corporation**
 - 2. Certification: Tile certified by the Porcelain Tile Certification Agency.
 - 3. Face Size: **11-13/16 by 11-13/16 inches.**
 - 4. Thickness: **3/8 inch.**
 - 5. Product Use Classification: Interior, Wet (IW).
 - 6. Tile Color, Glaze, and Pattern: As selected by Architect from manufacturer's full range.
 - 7. Grout Color: As selected by Architect from manufacturer's full range.
 - 8. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:
 - a. Base Cap: Surface bullnose, module size same as adjoining flat tile.
 - 1) Unless otherwise indicated.
 - b. Wainscot Cap: Surface bullnose, module size same as adjoining flat tile.
 - 1) Unless otherwise indicated.
 - c. External Corners: Surface bullnose, module size same as adjoining flat tile.
 - d. Internal Corners: Field-buttet square corners.

2.4 THRESHOLDS

- A. General: Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes.
 - 1. Bevel edges at 1:2 slope, with lower edge of bevel aligned with or up to **1/16 inch** above adjacent floor surface. Finish bevel to match top surface of threshold. Limit height of threshold to **1/2 inch** or less above adjacent floor surface.
- B. Marble Thresholds: ASTM C503/C503M, with a minimum abrasion resistance of 10 in accordance with ASTM C1353/C1353M or ASTM C241/C241M and with honed finish.
 - 1. Description:
 - a. Provide the following:
 - 1) White Italian.

2.5 WATERPROOF MEMBRANES

- A. General: Manufacturer's standard product that complies with ANSI A118.10 and ANSI A118.12 and is recommended by manufacturer for application indicated. Include reinforcement and accessories recommended by manufacturer.
- B. Waterproof Membrane, Fluid Applied: Liquid-latex rubber or elastomeric polymer with continuous fabric reinforcement.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. **Laticrete International, Inc.**
 - b. **MAPEI Corporation**
 - c. **Noble Company (The)**

2.6 SETTING MATERIALS

- A. Portland Cement Mortar (Thickset) Installation Materials: ANSI A108.02.
 - 1. Cleavage Membrane: Installer's option of material that complies with ANSI A108.02, paragraph 3.8.
 - 2. Reinforcing Wire Fabric: Galvanized, welded-wire fabric, **2 by 2 inches** by **0.062-inch** diameter; comply with ASTM A1064/A1064M except for minimum wire size.
 - 3. Expanded Metal Lath: Diamond-mesh lath complying with ASTM C847.
 - a. Base Metal and Finish for Interior Applications: Uncoated or zinc-coated (galvanized) steel sheet, with uncoated steel sheet painted after fabrication into lath.
 - b. Base Metal and Finish for Exterior Applications: Zinc-coated (galvanized)

- steel sheet.
 - c. Configuration over Studs and Furring: Flat.
 - d. Configuration over Solid Surfaces: Self-furring.
 - e. Weight: **3.4 lb/sq. yd.**
 - 4. Latex Additive: Manufacturer's standard water emulsion, serving as replacement for part or all of gaging water, of type specifically recommended by latex-additive manufacturer for use with field-mixed portland cement and aggregate mortar bed.
- B. Improved Modified Dry-Set Mortar (Thinset): ANSI A118.15.
- 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. **Laticrete International, Inc.**
 - b. **MAPEI Corporation**
 - 2. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
 - 3. Provide prepackaged, dry-mortar mix combined with acrylic resin or styrene-butadiene-rubber liquid-latex additive at Project site.

2.7 GROUT MATERIALS

- A. Sand-Portland Cement Grout: ANSI A108.10, consisting of white or gray cement and white or colored aggregate as required to produce color indicated.
- B. High-Performance Tile Grout: ANSI A118.7.
- 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. **Laticrete International, Inc.**
 - b. **MAPEI Corporation**
 - 2. Polymer Type:
 - a. Dry, redispersible form, prepackaged with other dry ingredients.

2.8 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting and adhesive materials for installations indicated.
- B. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
 - 1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
 - 2. Verify that concrete substrates for tile floors installed with bonded mortar bed or thinset mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.
 - a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
 - b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.
 - 3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
 - 4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove coatings, including curing compounds or other coatings, that are incompatible with tile-setting materials.
- B. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thinset mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
- C. Where indicated, prepare substrates to receive waterproof membrane by applying a reinforced mortar bed that complies with ANSI A108.1 and is sloped **1/4 inch per foot** toward drains.
- D. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.
- E. Substrate Flatness:
 - 1. For tile shorter than **15 inches**, confirm that structure or substrate is limited to variation of **1/4 inch in 10 ft.** from the required plane, and no more than

1/16 inch in 12 inches when measured from tile surface high points.

3.3 INSTALLATION OF CERAMIC TILE SYSTEM

- A. Install tile backing panels and treat joints in accordance with ANSI A108.11 and manufacturer's written instructions for type of application indicated.
- B. Install waterproof membrane to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness that is bonded securely to substrate.
 - 1. Allow waterproof membrane to cure and verify by testing that it is watertight before installing tile or setting materials over it.
- C. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness that is bonded securely to substrate.
 - 1. Allow crack isolation membrane to cure before installing tile or setting materials over it.
- D. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
 - 1. Add materials, water, and additives in accurate proportions.
 - 2. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.
- E. Install tile in accordance with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of ANSI A108 series that are referenced in TCNA installation methods and specified in tile installation schedules, and apply to types of setting and grouting materials used.
 - 1. For the following installations, follow procedures in ANSI A108 series of tile installation standards for providing 95 percent mortar coverage:
 - a. Tile floors in wet areas.
 - b. Tile floors consisting of tiles **8 by 8 inches** or larger.
 - c. Tile floors consisting of rib-backed tiles.
 - 2. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
 - 3. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

4. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.
 5. Where accent tile differs in thickness from field tile, vary setting-bed thickness so that tiles are flush.
 6. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
 - a. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets, so joints between sheets are not apparent in finished Work.
 - b. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
 - c. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.
 7. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.
- F. Movement Joints: Provide movement joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated on Drawings. Form joints during installation of setting materials, mortar beds, and tile. Keep joints free of dirt, debris, and setting materials prior to filling with sealants. Do not saw-cut joints after installing tiles.
1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
- G. Thresholds: Install stone and solid surface thresholds in same type of setting bed as adjacent floor unless otherwise indicated.
1. At locations where mortar bed (thickset) would otherwise be exposed above adjacent floor finishes, set thresholds in improved modified dry-set mortar (thinset).
 2. Do not extend waterproof membrane under thresholds set in improved modified dry-set mortar. Fill joints between such thresholds and adjoining tile set on waterproof membrane with elastomeric sealant.

3.4 ADJUSTING AND CLEANING

- A. Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.
- B. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
1. Remove grout residue from tile as soon as possible.
 2. Clean grout smears and haze from tile in accordance with tile and grout

manufacturer's written instructions. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

3.5 PROTECTION

- A. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.
- B. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.
- C. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.6 INTERIOR CERAMIC TILE INSTALLATION SCHEDULE

- A. Interior Floor Installations, Concrete Subfloor:
 - 1. TCNA F111 At First Floor and at slabs on grade - depress slab 2": Method ANSI A108.1B. Cement mortar bed (thickset) installed over cleavage membrane.
 - a. Ceramic Tile Type: Porcelain Floor Tile.
 - b. Bond Coat for Cured-Bed Method: Improved modified dry-set mortar.
 - c. Grout: High-performance unsanded cement grout.
 - d. Joint Width: **1/8 inch**.
 - e. Movement Joints: Types located on Drawings.
- B. Interior Wall Installations, Wood or Metal Studs or Furring:
 - 1. TCNA W245 Porcelain Wall Tile and Wainscots: Thinset mortar on glass-mat, water-resistant gypsum backer board.
 - a. Ceramic Tile Type: Porcelain Wall Tile.
 - b. Thinset Mortar: Improved modified dry-set mortar.
 - c. Grout: High-performance unsanded cement grout.
 - d. Waterproof Membrane: As recommended by setting material manufacturer.
 - e. Joint Width: **1/8 inch**.
 - f. Movement Joints: Types located on Drawings.

END OF SECTION 093014

DIVISION 9 - FINISHES

SECTION 095113 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Acoustical panels.
2. Metal suspension system.
3. Metal edge moldings and trim.

1.2 ACTION SUBMITTALS

A. Product Data:

1. For each type of product.

B. Samples: For each exposed product and for each color and texture specified, **6 inches** in size.

C. Samples for Initial Selection: For components with factory-applied finishes.

1.3 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each acoustical panel ceiling, for tests performed by manufacturer and witnessed by a qualified testing agency.

B. Evaluation Reports: For each acoustical panel ceiling suspension system and anchor and fastener type, from ICC-ES.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical panels, suspension-system components, and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

1.5 FIELD CONDITIONS

A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are

enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Source Limitations for Ceiling System: Obtain each type of acoustical ceiling panel and its supporting suspension system from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: Class A in accordance with ASTM E1264.
 - 2. Smoke-Developed Index: 50 or less.

2.3 ACOUSTICAL PANELS

- A. ACT Type 1:
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Armstrong No. 1810 Fine Fissured or comparable product by one of the following:
 - a. Certain Teed; SAINT-GOBAIN
 - b. USG Corporation
 - 2. Acoustical Panel Standard: Provide manufacturer's standard panels in accordance with ASTM E1264 and designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.
 - 3. Classification: Provide panels as follows:
 - a. Type and Form, Type III: Mineral base with painted finish; Form 2, water felted Form 4, cast or molded.
 - b. Pattern: D (fissured).
 - 4. Color: White.
 - 5. Light Reflectance (LR): Not less than 0.80.
 - 6. Ceiling Attenuation Class (CAC): Not less than 40.
 - 7. Noise Reduction Coefficient (NRC): Not less than 0.70.
 - 8. Edge/Joint Detail: Square.
 - 9. Thickness: **3/4 inch.**
 - 10. Modular Size: **24 by 24 inches.**
 - 11. Antimicrobial Treatment: Manufacturer's standard broad spectrum, antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested

in accordance with ASTM D3273, ASTM D3274, or ASTM G21 and evaluated in accordance with ASTM D3274 or ASTM G21.

12. Install in Grid Type 1

B. ACT Type 2:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Armstrong Fine Fissured Ceramaguard #607 or comparable product by one of the following:
 - a. Certain Teed; SAINT-GOBAIN
 - b. USG Corporation
2. Acoustical Panel Standard: Provide manufacturer's standard panels in accordance with ASTM E1264 and designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.
3. Classification: Provide panels as follows:
 - a. Type and Form, Type XX: High-density, ceramic- and mineral-base panels with scrubbable finish, resistant to heat, moisture, and corrosive fumes.
 - b. Pattern: D (fissured).
4. Color: White.
5. Light Reflectance (LR): Not less than 0.75.
6. Ceiling Attenuation Class (CAC): Not less than 35.
7. Noise Reduction Coefficient (NRC): Not less than 0.55.
8. Edge/Joint Detail: Square.
9. Thickness: **5/8 inch**.
10. Modular Size: **24 by 24 inches**.
11. Antimicrobial Treatment: Manufacturer's standard broad spectrum, antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested in accordance with ASTM D3273, ASTM D3274, or ASTM G21 and evaluated in accordance with ASTM D3274 or ASTM G21.
12. Install in Grid Type 2

C. ACT Type 3:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Armstrong Clean Room VL Unperforated or comparable product by one of the following:
 - a. Certain Teed; SAINT-GOBAIN
 - b. USG Corporation
2. Acoustical Panel Standard: Provide manufacturer's standard panels in accordance with ASTM E1264 and designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.
3. Classification: Provide panels as follows:
 - a. Type and Form, Type IV Form 2: Mineral base with membrane-faced

- overlay; Form 2, water felted; with vinyl overlay on face.
 - b. Pattern: G (smooth) Unperforated.
- 4. Color: White.
- 5. Light Reflectance (LR): Not less than 0.80.
- 6. Ceiling Attenuation Class (CAC): Not less than 40.
- 7. Edge/Joint Detail: Square.
- 8. Thickness: **5/8 inch**.
- 9. Modular Size: **24 by 24 inches**.
- 10. Antimicrobial Treatment: Manufacturer's standard broad spectrum, antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested in accordance with ASTM D3273, ASTM D3274, or ASTM G21 and evaluated in accordance with ASTM D3274 or ASTM G21.
- 11. Install in Grid Type 2

D. ACT Type 4:

- 1. Basis-of-Design Product: Subject to compliance with requirements, provide Armstrong No. 1717 School Zone Fine Fissured or comparable product by one of the following:
 - a. Certain Teed; SAINT-GOBAIN
 - b. USG Corporation
- 2. Acoustical Panel Standard: Provide manufacturer's standard panels in accordance with ASTM E1264 and designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.
- 3. Classification: Provide panels as follows:
 - a. Type and Form, Type III: Mineral base with painted finish; Form 2, water felted Form 4, cast or molded.
 - b. Pattern: D (fissured).
- 4. Color: White.
- 5. Light Reflectance (LR): Not less than 0.80.
- 6. Ceiling Attenuation Class (CAC): Not less than 40.
- 7. Noise Reduction Coefficient (NRC): Not less than 0.70.
- 8. Edge/Joint Detail: Angled Tegular.
- 9. Thickness: **3/4 inch**.
- 10. Modular Size: **24 by 24 inches**.
- 11. Antimicrobial Treatment: Manufacturer's standard broad spectrum, antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested in accordance with ASTM D3273, ASTM D3274, or ASTM G21 and evaluated in accordance with ASTM D3274 or ASTM G21.
- 12. Install in Grid Type 1

2.4 METAL SUSPENSION SYSTEM

A. Grid Type 1:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Armstrong Prelude XL, or USG DX or comparable product by one of the following:
 - a. Armstrong Ceiling & Wall Solutions
 - b. USG Corporation
2. Metal Suspension-System Standard: Provide manufacturer's standard, direct-hung, metal suspension system and accessories in accordance with ASTM C635/C635M and designated by type, structural classification, and finish indicated.
 - a. High-Humidity Finish: Where indicated, provide coating tested and classified for "severe environment performance" in accordance with ASTM C635/C635M.
3. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized, **G30** coating designation; with prefinished **15/16-inch-** wide metal caps on flanges.
 - a. Structural Classification: Intermediate-duty system.
 - b. End Condition of Cross Runners: Override (stepped) or butt-edge type.
 - c. Face Design: Flat, flush.
 - d. Cap Material: Cold-rolled steel.
 - e. Cap Finish: Painted white.
 - f. Main Runners: Armstrong #7300

B. Grid Type 2:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Armstrong Prelude Plus XL or USG DXLA 15/16" Tee System or comparable product by one of the following:
 - a. Armstrong Ceiling & Wall Solutions
 - b. USG Corporation
2. Metal Suspension-System Standard: Provide manufacturer's standard, direct-hung, metal suspension system and accessories in accordance with ASTM C635/C635M and designated by type, structural classification, and finish indicated.
 - a. High-Humidity Finish: Where indicated, provide coating tested and classified for "severe environment performance" in accordance with ASTM C635/C635M.
3. Wide-Face, Aluminum-Capped, Double-Web, Hot-Dip Galvanized, G60 (Z180),

Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; hot-dip galvanized, **G60** coating designation; with prefinished, **15/16-inch**- wide aluminum caps on flanges.

- a. Structural Classification: Intermediate-duty system.
- b. Face Design: Flat, flush.
- c. Cap Finish: Painted white.

2.5 ACCESSORIES

- A. Attachment Devices: Size for five times the design load indicated in ASTM C635/C635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
- B. Wire Hangers, Braces, and Ties: Provide wires as follows:
 - 1. Zinc-Coated, Carbon-Steel Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper.
 - 2. Size: Wire diameter sufficient for its stress at three times hanger design load (ASTM C635/C635M, Table 1, "Direct Hung") will be less than yield stress of wire, but not less than **0.106-inch**- diameter wire.

2.6 METAL EDGE MOLDINGS AND TRIM

- A. Metal Edge Moldings and Trim:
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Armstrong Ceiling & Wall Solutions
 - b. Certain Teed; SAINT-GOBAIN
 - c. USG Corporation
 - 2. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.
 - a. Edge moldings to fit acoustical panel edge details and suspension systems indicated and match width and configuration of exposed runners unless otherwise indicated.
 - b. For lay-in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.
 - c. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

2.7 ACOUSTICAL SEALANT

- A. Acoustical Sealant: As specified in Section 079219 "Acoustical Joint Sealants."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.
- B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated, and comply with layout shown on reflected ceiling plans.
- B. Layout openings for penetrations centered on the penetrating items.

3.3 INSTALLATION OF ACOUSTICAL PANEL CEILINGS

- A. Install acoustical panel ceilings in accordance with ASTM C636/C636M and manufacturer's written instructions.
- B. Suspend ceiling hangers from building's structural members and as follows:
 - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
 - 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
 - 3. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structure or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
 - 4. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive

- anchors, or power-actuated fasteners that extend through forms into concrete.
 5. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
 6. Do not attach hangers to steel deck tabs.
 7. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 8. Space hangers not more than **48 inches** o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than **8 inches** from ends of each member.
 9. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
- C. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
 2. Screw attach moldings to substrate at intervals not more than **16 inches** o.c. and not more than **3 inches** from ends. Miter corners accurately and connect securely.
 3. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- D. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- E. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide precise fit.
1. Arrange directionally patterned acoustical panels as follows:
 - a. As indicated on reflected ceiling plans.
 2. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.
 3. For reveal-edged panels on suspension-system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
 4. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.

3.4 ERECTION TOLERANCES

- A. Suspended Ceilings: Install main and cross runners level to a tolerance of **1/8 inch in 12 feet**, non-cumulative.
- B. Moldings and Trim: Install moldings and trim to substrate and level with ceiling suspension system to a tolerance of **1/8 inch in 12 feet**, non-cumulative.

3.5 CLEANING

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.
- B. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 095113

DIVISION 9 - FINISHES
SECTION 096513 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Thermoset-rubber base.
 - 2. Rubber molding accessories.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified, not less than **12 inches** long.
- C. Samples for Initial Selection: For each type of product indicated.
- D. Product Schedule: For resilient base and accessory products.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Furnish not less than **10 linear feet** for every **500 linear feet** or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.5 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 - 1. Coordinate mockups in this Section with mockups specified in other Sections.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than **50 deg F** or more than **90 deg F**.

1.7 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than **70 deg F** or more than **95 deg F**, in spaces to receive resilient products during the following periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than **55 deg F** or more than **95 deg F**.
- C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 THERMOSET-RUBBER BASE

- A. Manufacturers: available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Armstrong World Industries, Inc.
 - 2. Burke Mercer Flooring Products; a division of Burke Industries Inc.
 - 3. Flexco.
 - 4. Johnsonite; a Tarkett company.
 - 5. Roppe Corporation, USA.
- B. Product Standard: ASTM F1861, Type TS (rubber, vulcanized thermoset), Group I (solid, homogeneous).
 - 1. Group: I (solid, homogeneous).
 - 2. Style and Location:
 - a. Style B, Cove.
- C. Minimum Thickness: **0.125 inch**.
- D. Height: **4 inches**.
- E. Lengths: Coils in manufacturer's standard length.
- F. Outside Corners: Preformed.
- G. Inside Corners: Preformed.

- H. Colors and Patterns: As indicated by manufacturer's designations.

2.2 RUBBER MOLDING ACCESSORY

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. Roppe Corporation; Roppe Holding Company
 - 2. VPI Corporation
- B. Description: Rubber cap for cove carpet cap for cove resilient floor covering carpet bar for tackless installations carpet edge for glue-down applications nosing for carpet nosing for resilient floor covering reducer strip for resilient floor covering joiner for tile and carpet transition strips.
- C. Profile and Dimensions: As require to meet ADA Handicapped Standards.
- D. Locations: At locations where needed to make transitions between differing adjacent floor materials.
- E. Colors and Patterns: As indicated by manufacturer's designations.

2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
 - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
 - 1. Installation of resilient products indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

- B. Concrete Substrates for Resilient Stair Accessories: Prepare horizontal surfaces according to ASTM F 710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
 - 3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
 - 4. Moisture Testing: Perform tests so that each test area does not exceed **200 sq. ft.**, and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of **3 lb of water/1000 sq. ft.** in 24 hours.
 - b. Relative Humidity Test: Using in-situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install resilient products until materials are the same temperature as space where they are to be installed.
 - 1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.
- E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.3 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- G. Preformed Corners: Install preformed corners before installing straight pieces.

3.4 RESILIENT ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient accessories.
- B. Resilient Stair Accessories:
 - 1. Use stair-tread-nose filler to fill nosing substrates that do not conform to tread contours.
 - 2. Tightly adhere to substrates throughout length of each piece.
 - 3. For treads installed as separate, equal-length units, install to produce a flush joint between units.
- C. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

3.5 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.
- B. Perform the following operations immediately after completing resilient-product installation:
 - 1. Remove adhesive and other blemishes from surfaces.
 - 2. Sweep and vacuum horizontal surfaces thoroughly.
 - 3. Damp-mop horizontal surfaces to remove marks and soil.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Floor Polish: Remove soil, adhesive, and blemishes from resilient stair treads before applying liquid floor polish.
 - 1. Apply two coat(s).
- E. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION 096513

DIVISION 9 - FINISHES

SECTION 096520 - LUXURY VINYL TILE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Solid vinyl floor tile, (Luxury Vinyl Tile).

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: Full-size units of each color, texture, and pattern of floor tile required.
- C. Samples for Initial Selection: For each type of floor tile indicated.
- D. Product Schedule: For floor tile.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of floor tile to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Provide four percent of total square footage installed (or one carton minimum, whichever is grater) unopened cartons of each color floor tile, each base, each

stair skirting / tread / riser used, and one gallon of each type adhesive used, as Owner's extra stock.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are competent in techniques required by manufacturer for floor tile installation and seaming method indicated.
 - 1. Engage an installer who employs workers for this Project who are trained or certified by floor tile manufacturer for installation techniques required.
- B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 - 1. Coordinate mockups in this Section with mockups specified in other Sections.
 - a. Size: Minimum **100 sq. ft.** for each type, color, and pattern in locations directed by Architect.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than **50 deg F** or more than **90 deg F**. Store floor tiles on flat surfaces.

1.9 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than **70 deg F** or more than **95 deg F**, in spaces to receive floor tile during the following periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than **55 deg F** or more than **95 deg F**.
- C. Close spaces to traffic during floor tile installation.

- D. Close spaces to traffic for 48 hours after floor tile installation.
- E. Install floor tile after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For resilient floor tile, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
 - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

2.2 LUXURY VINYL FLOOR TILE (LVT)

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Mannington Commercial
 - 2. Armstrong Flooring
- B. LVT Type 1: Plank Linear Style:
 - 1. Basis of Design: Mannington Commercial
 - 2. Size: 4" x 36" x 0.098"
 - 3. Collection: Nature's Paths
 - 4. Style: Wood
 - 5. Color: As selected by Architect.
 - 6. Pattern: As shown on Drawings.
- C. LVT Type 2: Modular Square Style:
 - 1. Basis of Design: Mannington Commercial
 - 2. Size: 12" x 12" x 0.098"
 - 3. Collection: Spacia
 - 4. Style: Stone
 - 5. Color: As selected by Architect
 - 6. Pattern: As shown on Drawings.
- D. LVT Type 3: Modular Square Style:
 - 1. Basis of Design: Mannington Commercial
 - 2. Size: 18" x 18" x 0.098"
 - 3. Collection: Spacia
 - 4. Style: Stone
 - 5. Color: As selected by Architect
 - 6. Pattern: As shown on Drawings.

2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.
- C. Floor Polish: Provide protective, liquid floor-polish products recommended by floor tile manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
 - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates: Prepare according to ASTM F 710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
 - 3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
 - 4. Moisture Testing: Perform tests so that each test area does not exceed 500 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of **3 lb of water/1000 sq. ft.** in 24 hours.

- b. Relative Humidity Test: Using in-situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install floor tiles until materials are the same temperature as space where they are to be installed.
 - 1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.
- E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3.3 FLOOR TILE INSTALLATION

- A. Comply with manufacturer's written instructions for installing floor tile.
- B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
 - 1. Lay tiles square with room axis.
- C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.
 - 1. Lay tiles .
 - a. Verify with Architect the direction of running or alternating grain.
- D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.
- E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.
- G. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in installation areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.
- H. Adhere floor tiles to substrates using a full spread of adhesive applied to substrate to

produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.
- B. Perform the following operations immediately after completing floor tile installation:
 - 1. Remove adhesive and other blemishes from surfaces.
 - 2. Sweep and vacuum surfaces thoroughly.
 - 3. Damp-mop surfaces to remove marks and soil.
- C. Protect floor tile from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Floor Polish: Remove soil, adhesive, and blemishes from floor tile surfaces before applying liquid floor polish.
 - 1. Apply two coat(s).
- E. Cover floor tile until Substantial Completion.

END OF SECTION 096520

DIVISION 9 - FINISHES

SECTION 098800 - CONCRETE SEALER

Part 1 GENERAL

1.1 SECTION INCLUDES

- A Siloxane water repellent coating system for concrete slabs (where "sealed concrete" is indicated).

1.2 RELATED SECTIONS

- A Division 3 Section - Cast-In-Place Concrete

1.3 REFERENCES

- A SSPC-SP 13 / NACE No. 6 Surface Preparation for Concrete

1.4 SUBMITTALS

- A. Submit the following according to Conditions of Contract and Division 1 Specifications Sections.

- B. Product Data: Manufacturer's data sheets on each coating product should include:

- 1 Product characteristics
- 2 Surface preparation instructions and recommendations
- 3 Primer requirements and finish specification
- 4 Storage and handling requirements and recommendations
- 5 Application methods
- 6 Cautions

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver manufacturer's unopened containers to the work site. Packaging shall bear the manufacturer's name, label, and the following list of information:

- 1 Product name, and type (description)
- 2 Application & use instructions
- 3 Surface preparation
- 4 VOC content
- 5 Environmental issues
- 6 Batch date
- 7 Color number

- B. Storage: Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction. Store materials in an area that is within the acceptable temperature range, per manufacturer's instructions. Protect from freezing.

- C. Handling: Maintain a clean, dry storage area, to prevent contamination or damage to the coatings.

1.7 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturers for optimum results. Do not apply coatings under environmental conditions outside manufacturer's absolute limits.

Part 2 PRODUCTS

2.1 MANUFACTURERS

- A Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- The Sherwin-Williams, H&C® Company,
101 Prospect Avenue NW
Cleveland, OH 44115
Tel: (800) 321-8194
Fax: (216) 566-1392
www.sherwin-williams.com

2.2 APPLICATIONS/SCOPE

- A Surfaces To Be Coated: Concrete Floors.

2.3 SCHEDULE INDEX

A. CONCRETE FLOORS

1 Siloxane Water Repellents

- a. Solvent-Borne Siloxane: Clear.
- b. Available Products listed in schedule at end of this section.

2.4 MATERIALS - GENERAL REQUIREMENTS

A Water Repellents - General

- 1 Unless otherwise indicated, provide factory-mixed coatings. When required, mix coatings to correct consistency in accordance with manufacturer's instructions before application. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.
- 2 Air and surface temperature should be between 50° and 90°F for 24 hours following application. Do not apply materials when air or surface temperature is less than 40°F or if temperatures are expected to fall below 40°F within 72 hours of material application. Do not apply material if air or surface temperature exceed 90°F, unless products are designed specifically for these conditions.

- B CAUTION: Do not use membrane-forming curing compounds to cure concrete at areas where "sealed concrete" is indicated. These areas shall be moist cured using absorptive covers and continuous water-fog spray; or shall be cured by application of moisture-retaining covers which will not interfere with the proper adhesion of the specified concrete sealer (water repellant coating system).

C Primers

- 1 Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.

2.5 ACCESSORIES

- A Coating Application Accessories

- 1 Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required, per manufacturer's specifications.
- 2 Some surfaces such as inclined driveways, garages, steps, patios, etc., may require a slip resistant additive for safety. Add a slip resistant additive to the final coat applied following manufacturer's label directions. This product should not be used in place of a non-skid finish.

PART 3 EXECUTION

3.1 EXAMINATION

- A Do not begin application of coatings until substrates have been properly prepared. Notify Architect of unsatisfactory conditions before proceeding.
- B If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C Proceed with work only after conditions have been corrected, and approved by all parties, otherwise application of coatings will be considered as an acceptance of surface conditions.

3.2 SURFACE PREPARATION

- A Proper product selection, surface preparation, and application affect coating performance. Coating integrity and service life will be reduced because of improperly prepared surfaces. Selection and implementation of proper surface preparation ensures coating adhesion to the substrate and prolongs the service life of the coating system.
- B Selection of the proper method of surface preparation depends on the substrate, the environment, and the expected service life of the coating system. Economics, surface contamination, and the effect on the substrate will also influence the selection of surface preparation methods. New concrete and mortar must be cured. For very smooth surfaces (troweled surfaces with no porosity) use H&C® Concrete Etching Solution at full strength to open up the surface to allow the coating to penetrate into the surface. For smooth-troweled concrete with some porosity, 1 part H&C® Concrete Etching Solution to two parts water should be used. Only etch horizontal concrete, follow label directions carefully, including neutralization. Prepared concrete should have a pH between 7 and 10. Because water will collect in low spots and may deposit etching and cleaning residue, it is recommended that, if needed, the surface be vacuumed to remove any remaining water.
- C The surface must be dry and in sound condition. Remove oil, dust, dirt, loose rust, peeling paint or other contamination to ensure good adhesion.
- D Remove mildew before painting by washing with a solution of 1 part liquid household bleach and 3 parts of warm water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with clean water and allow the surface to dry 48 hours before painting. Wear protective glasses or goggles, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.
- E No exterior painting should be done immediately after a rain, during foggy weather, when rain is predicted, or when the temperature is below 50°F unless products are designed specifically for these conditions.
- F Testing

- 1 Due to the wide variety of substrates, preparation methods, application methods and environments, the Contractor shall test the product in an inconspicuous spot for adhesion and compatibility prior to full scale application.
- 2 To determine if the surface is sealed with another coating or a curing compound, sprinkle water onto the surface. If the water is absorbed and the surface becomes darker, the surface is not sealed. If the water beads up, there is a coating or curing compound that must be removed to allow the coating to penetrate. It is crucial to ensure proper penetration of the coating.

G Repair

On floor surfaces, use appropriate patching material.

H Slip Resistance

Some surfaces such as inclined driveways, garages, steps, patios, etc., may require a slip resistant additive for safety. Add H&C® SharkGrip® Slip Resistant Additive to the final coat applied following label directions. This product should not be used in place of a non-skid finish.

3.3 INSTALLATION

- A Apply all coatings and materials in strict accordance with manufacturer's printed instructions and recommendations. Mix and thin coatings according to manufacturer's recommendation.
- B Do not apply to wet or damp surfaces.
- 1 Wait at least 30 days before applying to new concrete or masonry. Or follow manufacturer's procedures to apply appropriate coatings prior to 30 days.
 - 2 Test new concrete for moisture content.
 - 3 Wait until concrete is fully dry after rain, fog, or dew.
- C Apply coatings using methods recommended by manufacturer.
- D Uniformly apply coatings without runs, drips, or sags, without brush marks, and with consistent sheen.
- E Apply coatings at spreading rate required to achieve the manufacturer's recommended dry film thickness.
- F Regardless of number of coats specified, apply as many coats as necessary for complete hide and uniform appearance.

3.4 PROTECTION

- A Protect finished coatings from damage until completion of project.
- B Touch-up damaged coatings after substantial completion; following manufacturer's recommendation for touch up or repair of damaged coatings. Repair any defects that will hinder the performance of the coatings.

3.5 SCHEDULE

A. CONCRETE FLOORS (where "Sealed Concrete" is indicated):

1. Siloxane
 - a. Solvent-Borne Siloxane: Clear

New Administrative Office - Verda Elem. School
Montgomery, Louisiana

Re-Bid

25005 / CSW
098800-5

1st Coat: S-W H&C® HB-100
2nd Coat: S-W H&C® HB-100

END OF SECTION

DIVISION 9 - FINISHES

SECTION 099113 - EXTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Primers.
2. Finish coatings.
3. Floor sealers and paints.
4. Pavement Marking

B. Related Requirements:

1. Section 051200 "Structural Steel Framing" for shop priming of metal substrates.
2. Section 055000 "Metal Fabrications" for shop priming metal fabrications.
3. Section 055213 "Pipe and Tube Railings" for shop priming pipe and tube railings.
4. Section 099300 "Staining and Transparent Finishing" for surface preparation and application of wood stains and transparent finishes on exterior wood substrates.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include preparation requirements and application instructions.
2. Indicate VOC content.

B. Samples: For each type of topcoat product.

C. Samples for Initial Selection: For each type of topcoat product.

D. Samples for Verification: For each type of paint system and each color and gloss of topcoat.

1. Submit Samples on rigid backing, 8 inches (200 mm) square.
2. Apply coats on Samples in steps to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

E. Product Schedule: Use same designations indicated on Drawings and in the exterior painting schedules to cross-reference paint systems specified in this Section. Include color designations.

1.3 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Products: 1 gal. (3.8 L) of each material and color applied.

1.4 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each paint system.
 - a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft. (9 sq. m).
 - b. Other Items: Architect will designate items or areas required.
2. Final approval of color selections will be based on mockups.
 - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.6 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).
- B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 PAINT PRODUCTS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Benjamin Moore & Co.
 - b. Sherwin-Williams Company
 - c. PPG Paints; PPG Industries, Inc.
- B. Source Limitations: Obtain each paint product from single source from single manufacturer.
- C. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."
- D. Material Compatibility:
 - 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer based on testing and field experience.
 - 2. For each coat in a paint system, provide products recommended in writing by topcoat manufacturer for use in paint system and on substrate indicated.
- E. Colors: As selected by Architect from manufacturer's full range.

2.2 PRIMERS

- A. Exterior, Alkali-Resistant, Water-Based Primer: Pigmented, water-based primer formulated for use on alkaline surfaces, such as exterior plaster, vertical concrete, and masonry.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Benjamin Moore & Co.
 - b. Sherwin-Williams Company
 - c. PPG Paints; PPG Industries, Inc.
 - 2. Basis-of-Design Product: Subject to compliance with requirements, provide Sherwin Williams "Loxon" Concrete and Masonry Primer-Sealer LX02W0050 or comparable product by one of the following:
 - a. Benjamin Moore & Co.
 - b. PPG Paints; PPG Industries, Inc.
- B. Exterior, Alkyd/Oil Wood Primer: Alkyd/oil-based primer that is resistant to extractive bleeding when applied to wood substrates with less than 15 percent moisture content;

formulated for sag, mold, and microbial resistance; for hiding stains; and for use on exterior wood subject to extractive bleeding.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Benjamin Moore & Co.
 - b. Sherwin-Williams Company
 - c. PPG Paints; PPG Industries, Inc.
 2. Basis-of-Design Product: Subject to compliance with requirements, provide Sherwin Williams A-100 Exterior Alkyd Wood Primer Y24WB Series or comparable product by one of the following:
 - a. Benjamin Moore & Co.
 - b. PPG Paints; PPG Industries, Inc.
- C. Exterior, Latex Block Filler: Water-based, pigmented, high-solids, emulsion coating formulated to bridge and fill porous surfaces of exterior concrete masonry units in preparation for specified subsequent coatings.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Benjamin Moore & Co.
 - b. Sherwin-Williams Company
 - c. PPG Paints; PPG Industries, Inc.
 2. Basis-of-Design Product: Subject to compliance with requirements, provide Sherwin Williams PrepRite Latex Block Filler B25W00025 or comparable product by one of the following:
 - a. Benjamin Moore & Co.
 - b. PPG Paints; PPG Industries, Inc.
 3. Minimum Solids Content: Manufacturer's standard percentage solids by volume.
- D. Quick-Drying, Alkyd Metal Primer: Corrosion-resistant, solvent-based, modified-alkyd primer; lead and chromate free; formulated for quick-drying capabilities and for use on cleaned, exterior steel surfaces.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Benjamin Moore & Co.
 - b. Sherwin-Williams Company
 - c. PPG Paints; PPG Industries, Inc.

2. Basis-of-Design Product: Subject to compliance with requirements, provide Sherwin Williams Kem Bond HS Universal Metal Primer or comparable product by one of the following:
 - a. Benjamin Moore & Co.
 - b. PPG Paints; PPG Industries, Inc.
- E. Water-Based, Galvanized-Metal Primer: Corrosion-resistant, pigmented, acrylic primer; formulated for use on cleaned/etched, exterior, galvanized metal to prepare it for subsequent water-based coatings.
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Benjamin Moore & Co.
 - b. Sherwin-Williams Company
 - c. PPG Paints; PPG Industries, Inc.
 2. Basis-of-Design Product: Subject to compliance with requirements, provide Sherwin Williams Pro Industrial Pro-Cryl Universal Primer B66-1300 or comparable product by one of the following:
 - a. Benjamin Moore & Co.
 - b. PPG Paints; PPG Industries, Inc.

2.3 FINISH COATINGS.

- A. Exterior Latex Paint, Semigloss: Water-based, pigmented emulsion coating formulated for alkali, mold, microbial, and water resistance and for use on exterior surfaces, such as masonry, portland cement plaster, and primed wood and metal.
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Benjamin Moore & Co.
 - b. Sherwin-Williams Company
 - c. PPG Paints; PPG Industries, Inc.
 2. Gloss Level: Manufacturer's standard semigloss finish.
- B. Textured Latex Coating, Low Sheen: Water-based, pigmented coating that contains sand or other hard aggregate and is formulated for use on exterior masonry, concrete masonry unit, and concrete surfaces.
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Benjamin Moore & Co.
 - b. Sherwin-Williams Company
 - c. Hempel (USA), Inc.
2. Gloss and Sheen Level: Manufacturer's standard low-sheen finish.
3. Aggregate Size: Manufacturer's standard Medium.
- C. Exterior Alkyd Enamel, Semigloss: Solvent-based, pigmented, alkyd enamel formulated for mold, microbial, and water resistance and for use on exterior, primed, wood and metal surfaces.
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Sherwin-Williams Company
 - b. PPG Paints; PPG Industries, Inc.
 2. Gloss Level: Manufacturer's standard semigloss finish.

2.4 FLOOR SEALERS AND PAINTS

- A. Solvent-Based, Concrete-Floor Sealer: Clear, acrylic, solvent-based sealer formulated for oil, gasoline, alkali, and water resistance and for use on exterior, concrete traffic surfaces.
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Benjamin Moore & Co., Instl-X Products
 - b. Sherwin-Williams Company, H&C Decorative Concrete Products
 - c. Euclid Chemical Super Diamond Clear Cure & Seal for Concrete

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 1. Concrete: 12 percent.
 2. Fiber-Cement Board: 12 percent.
 3. Masonry (Clay and Concrete Masonry Units): 12 percent.
 4. Wood: 15 percent.
 5. Portland Cement Plaster: 12 percent.

6. Gypsum Board: 12 percent.

- C. Portland Cement Plaster Substrates: Verify that plaster is fully cured.
- D. Exterior Gypsum Board Substrates: Verify that finishing compound is dry and sanded smooth.
- E. Verify suitability of substrates, including surface conditions and compatibility, with finishes and primers.
- F. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems specified in this Section.
- D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.
- F. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer but not less than the following:
 - 1. SSPC-SP 2.
- G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

- H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- I. Wood Substrates:
 - 1. Scrape and clean knots. Before applying primer, apply coat of knot sealer recommended in writing by topcoat manufacturer for exterior use in paint system indicated.
 - 2. Sand surfaces that will be exposed to view, and remove sanding dust.
 - 3. Prime edges, ends, faces, undersides, and backsides of wood.
 - 4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

3.3 INSTALLATION

- A. Apply paints in accordance with manufacturer's written instructions.
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
 - 3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
 - 4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 - 5. Primers specified in the exterior painting schedules may be omitted on items that are factory primed or factory finished if compatible with intermediate and topcoat coatings and acceptable to intermediate and topcoat paint manufacturers.
- B. Tint undercoats same color as topcoat, but tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
 - 1. Paint the following work where exposed to view:
 - a. Equipment, including panelboards and switch gear.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.

- e. Metal conduit.
- f. Plastic conduit.
- g. Tanks that do not have factory-applied final finishes.

3.4 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
 - 1. Do not clean equipment with free-draining water and prevent solvents, thinners, cleaners, and other contaminants from entering into waterways, sanitary and storm drain systems, and ground.
 - 2. Dispose of contaminants in accordance with requirements of authorities having jurisdiction.
 - 3. Allow empty paint cans to dry before disposal.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.5 EXTERIOR PAINTING SCHEDULE, CONCRETE SUBSTRATES

- A. Nontraffic Surfaces:
 - 1. Latex System, MPI EXT 3.1A:
 - a. Prime Coat: Exterior, alkali-resistant, water-based primer, MPI #3.
 - b. Intermediate Coat: Matching topcoat.
 - c. Topcoat: Exterior latex paint, low sheen, (MPI Gloss Level 3-4), MPI #15.
 - 2. Latex Aggregate System, MPI EXT 3.1B:
 - a. Prime Coat: As recommended in writing by topcoat manufacturer.
 - b. Intermediate Coat: As recommended in writing by topcoat manufacturer.
 - c. Topcoat: Textured latex coating, low sheen, MPI #15.
- B. Traffic Surfaces:
 - 1. Clear, Solvent-Based Sealer System, MPI EXT 3.2G:
 - a. Prime Coat: Matching topcoat.
 - b. Intermediate Coat: Matching topcoat.
 - c. Topcoat: Solvent-based, concrete-floor sealer, MPI #104.

C. Pavement Marking Paint:

1. Alkyd resin type, traffic marking paint, ready mixed, complying with Section 1015.12 (a) of the Louisiana Department of Transportation (La DOTD) - Louisiana Standard Specifications for Roads and Bridges (LSSRB).
 - a. White color for stalls and direction markings.
 - b. Blue and white for handicapped parking symbols.
 - c. Yellow color for roads.

3.6 EXTERIOR PAINTING SCHEDULE, METAL SUBSTRATES

A. Steel and Iron Substrates:

1. Alkyd System, MPI EXT 5.1D:
 - a. Prime Coat: Alkyd metal primer, MPI #79. Shop primer specified in Section in which substrate is specified.
 - b. Intermediate Coat: Matching topcoat.
 - c. Topcoat: Exterior alkyd enamel, semigloss, (MPI Gloss Level 5), MPI #94.

B. Galvanized-Metal Substrates:

1. Latex System, MPI EXT 5.3A:
 - a. Prime Coat: Water-based, galvanized-metal primer, MPI #134.
 - b. Intermediate Coat: Matching topcoat.
 - c. Topcoat: Exterior latex paint, semigloss, (MPI Gloss Level 5), MPI #11.

3.7 EXTERIOR PAINTING SCHEDULE, WOOD SUBSTRATES

A. Dressed-Lumber Substrates: Trim, Architectural woodwork.

1. Latex over Alkyd Primer System, MPI EXT 6.3A:
 - a. Prime Coat: Exterior, alkyd/oil wood primer, MPI #5.
 - b. Intermediate Coat: Matching topcoat.
 - c. Topcoat: Exterior latex paint, semigloss, (MPI Gloss Level 5), MPI #11.

END OF SECTION 099113

DIVISION 9 - FINISHES

SECTION 099123 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Primers.
2. Water-based finish coatings.
3. Solvent-based finish coatings.

B. Related Requirements:

1. Section 099300 "Staining and Transparent Finishing" for surface preparation and the application of wood stains and transparent finishes on interior wood substrates.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

1. Include preparation requirements and application instructions.

B. Samples for Initial Selection: For each type of topcoat product.

C. Samples for Verification: For each type of paint system and each color and gloss of topcoat.

1. Submit Samples on rigid backing, **8 inches** square.
2. Apply coats on Samples in steps to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

D. Product Schedule: Use same designations indicated on Drawings and in the Interior Painting Schedule to cross-reference paint systems specified in this Section. Include color designations.

1.3 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint Products: **1 gal.** of each material and color applied.

1.4 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Architect will select one surface to represent surfaces and conditions for application of each paint system.
 - a. Vertical and Horizontal Surfaces: Provide samples of at least **100 sq. ft.**
 - b. Other Items: Architect will designate items or areas required.
 - 2. Final approval of color selections will be based on mockups.
 - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
 - 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than **45 deg F**.
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.6 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between **50 and 95 deg F**.
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures of less than **5 deg F** above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 PRIMERS

- A. Interior/Exterior Latex Block Filler: Water-based, high-solids, emulsion coating formulated to bridge and fill porous surfaces of exterior concrete masonry units in preparation for specified subsequent coatings.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include,

but are not limited to, the following:

- a. Benjamin Moore & Co.
 - b. PPG Paints; PPG Industries, Inc.
 - c. Sherwin-Williams Company (The)
 2. Basis-of-Design Product: Subject to compliance with requirements, provide Sherwin Williams Heavy-Duty Block Filler or comparable product by one of the following:
 - a. Benjamin Moore & Co.
 - b. PPG Paints; PPG Industries, Inc.
 - c. Sherwin-Williams Company (The)
- B. Interior Latex Primer Sealer: Water-based latex sealer used on new interior plaster, concrete, and gypsum wallboard surfaces.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Benjamin Moore & Co.
 - b. PPG Paints; PPG Industries, Inc.
 - c. Sherwin-Williams Company (The)
 2. Basis-of-Design Product: Subject to compliance with requirements, provide Sherwin Williams PrepRite High Build Interior Latex Primer / Surfacer B28W601 or comparable product by one of the following:
 - a. Benjamin Moore & Co.
 - b. PPG Paints; PPG Industries, Inc.
 - c. Sherwin-Williams Company (The)
- C. Interior Alkyd Primer Sealer: Solvent-based, alkyd-type, primer/sealer for new interior wood, plaster, and porous surfaces,
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Benjamin Moore & Co.
 - b. PPG Paints; PPG Industries, Inc.
 - c. Sherwin-Williams Company (The)
 2. Basis-of-Design Product: Subject to compliance with requirements, provide Sherwin Williams PrepRite Easy Sand Quick Dry Alkyd Undercoater or comparable product by one of the following:
 - a. Benjamin Moore & Co.
 - b. PPG Paints; PPG Industries, Inc.
 - c. Sherwin-Williams Company (The)

- D. Alkyd Quick-Dry Primer for Metal: Corrosion-resistant, solvent-based, modified-alkyd primer; lead and chromate free; formulated for quick-drying capabilities and for use on cleaned, interior steel surfaces.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Benjamin Moore & Co.
 - b. PPG Paints; PPG Industries, Inc.
 - c. Sherwin-Williams Company (The)
 2. Basis-of-Design Product: Subject to compliance with requirements, provide Sherwin Williams Kem Kromik Universal Metal Primer or comparable product by one of the following:
 - a. Benjamin Moore & Co.
 - b. PPG Paints; PPG Industries, Inc.
 - c. Sherwin-Williams Company (The)
- E. Cementitious Galvanized Primer: Solvent-based primer composed of linseed oil/alkyd resin and portland cement for cleaned galvanized metal prior to finish coating.
1. Basis-of-Design Product: Subject to compliance with requirements, provide PPG Speedhide Interior/Exterior Galvanized Steel Primer - Ready Mix or comparable product by one of the following:
 - a. Sherwin Williams
- F. Water-Based Galvanized-Metal Primer: Corrosion-resistant, acrylic primer; formulated for use on cleaned/etched, exterior, galvanized metal to prepare it for subsequent water-based coatings.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Benjamin Moore & Co.
 - b. PPG Paints; PPG Industries, Inc.
 - c. Sherwin-Williams Company (The)
 2. Basis-of-Design Product: Subject to compliance with requirements, provide Sherwin Williams Pro Industrial Pro-Cryl Universal Primer or comparable product by one of the following:
 - a. Benjamin Moore & Co.
 - b. PPG Paints; PPG Industries, Inc.
 - c. Sherwin-Williams Company (The)

2.2 WATER-BASED FINISH COATS

- A. Interior, Latex, Flat: Pigmented, water-based paint for use on primed/sealed interior plaster and gypsum board, and on primed wood and metals.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Benjamin Moore & Co.
 - b. PPG Paints; PPG Industries, Inc.
 - c. Sherwin-Williams Company (The)
 - 2. Basis-of-Design Product: Subject to compliance with requirements, provide Sherwin Williams ProMar 400 Interior Latex Flat B30W400 Series or comparable product by one of the following:
 - a. Benjamin Moore & Co.
 - b. PPG Paints; PPG Industries, Inc.
 - c. Sherwin-Williams Company (The)
 - 3. Gloss and Sheen Level: Manufacturer's standard flat finish.
- B. Interior, Latex, Semigloss: Pigmented, water-based paint for use on primed/sealed interior plaster and gypsum board, and on primed wood and metals.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Benjamin Moore & Co.
 - b. PPG Paints; PPG Industries, Inc.
 - c. Sherwin-Williams Company (The)
 - 2. Basis-of-Design Product: Subject to compliance with requirements, provide Sherwin Williams ProMar 200 Interior Latex Semi-Gloss B31W2200 Series or comparable product by one of the following:
 - a. Benjamin Moore & Co.
 - b. PPG Paints; PPG Industries, Inc.
 - c. Sherwin-Williams Company (The)
 - 3. Gloss Level: Manufacturer's standard semigloss finish.

2.3 SOLVENT-BASED FINISH COATS

- A. Interior, Alkyd, Semigloss: Pigmented, solvent-based alkyd paint for use on primed/sealed interior plaster, gypsum, wood, and metal walls primarily in residential and moderate traffic commercial environments.
 - 1. Manufacturers: Subject to compliance with requirements, available

manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Benjamin Moore & Co.
 - b. PPG Paints; PPG Industries, Inc.
 - c. Sherwin-Williams Company (The)
2. Basis-of-Design Product: Subject to compliance with requirements, provide Sherwin Williams ProMar 200 Interior Alkyd Semi-Gloss B34W200 Series or comparable product by one of the following:
- a. Benjamin Moore & Co.
 - b. PPG Paints; PPG Industries, Inc.
 - c. Sherwin-Williams Company (The)
3. Gloss Level: Manufacturer's standard semigloss finish.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 1. Concrete: 12 percent.
 2. Fiber-Cement Board: 12 percent.
 3. Masonry (Clay and CMUs): 12 percent.
 4. Wood: 15 percent.
 5. Gypsum Board: 12 percent.
 6. Plaster: 12 percent.
- C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- D. Plaster Substrates: Verify that plaster is fully cured.
- E. Spray-Textured Ceiling Substrates: Verify that surfaces are dry.
- F. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
- G. Proceed with coating application only after unsatisfactory conditions have been corrected.
 1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.
- F. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- G. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- H. Aluminum Substrates: Remove loose surface oxidation.
- I. Wood Substrates:
 - 1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
 - 2. Sand surfaces that will be exposed to view, and dust off.
 - 3. Prime edges, ends, faces, undersides, and backsides of wood.
 - 4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.
- J. Cotton or Canvas Insulation Covering Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

3.3 INSTALLATION

- A. Apply paints according to manufacturer's written instructions.

1. Use applicators and techniques suited for paint and substrate indicated.
 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
 4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Painting Fire-Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
1. Paint the following work where exposed in equipment rooms:
 - a. Equipment, including panelboards and switch gear.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.
 - g. Tanks that do not have factory-applied final finishes.
 - h. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 2. Paint the following work where exposed in occupied spaces:
 - a. Equipment, including panelboards.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.
 - g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 - h. Other items as directed by Architect.
 - i. Paint exposed surfaces whether or not colors are designated in schedules, except where a surface or material is specifically indicated not to be painted or is to remain natural. Where an item or surface is not specifically

mentioned, paint the same as similar adjacent materials or surfaces. If color or finish is not designated, the Architect will select from standard colors or finishes available. Painting includes field-painting exposed bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron work, and primed metal surfaces of mechanical and electrical equipment. Painting is not required on prefinished items, finished metal surfaces, concealed surfaces, operating parts, and labels..

3. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.4 FIELD QUALITY CONTROL

- A. Dry-Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry-film thickness.
 1. Contractor shall touch up and restore painted surfaces damaged by testing.
 2. If test results show that dry-film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry-film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
 1. Do not clean equipment with free-draining water and prevent solvents, thinners, cleaners, and other contaminants from entering into waterways, sanitary and storm drain systems, and ground.
 2. Dispose of contaminants in accordance with requirements of authorities having jurisdiction.
 3. Allow empty paint cans to dry before disposal.
 4. Collect waste paint by type and deliver to recycling or collection facility.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE

A. Steel Substrates:

1. Alkyd System :

- a. Prime Coat: Alkyd quick-dry primer for metal.
- b. Intermediate Coat: Matching topcoat.
- c. Topcoat: Interior, alkyd, semigloss.

B. Galvanized-Metal Substrates:

1. Alkyd over Cementitious Primer System :

- a. Prime Coat: Cementitious galvanized primer.
- b. Intermediate Coat: Matching topcoat.
- c. Topcoat: Interior, alkyd, semigloss.

C. Finish Carpentry: Wood trim.

1. Alkyd System :

- a. Prime Coat: Interior alkyd primer sealer.
- b. Intermediate Coat: Matching topcoat.
- c. Topcoat: Interior, alkyd, semigloss.

D. Architectural Woodwork: casework.

1. Alkyd System :

- a. Prime Coat: Interior alkyd primer sealer.
- b. Intermediate Coat: Matching topcoat.
- c. Topcoat: Interior, alkyd, semigloss.

E. Spray-Textured Ceiling Substrates:

1. Latex, Flat System: Spray applied :

- a. Prime Coat: Matching topcoat.
- b. Topcoat: Interior, latex, flat.

F. Gypsum Board Substrates:

1. Latex over Latex Sealer System :

- a. Prime Coat: Interior latex primer sealer.
- b. Intermediate Coat: Matching topcoat.
- c. Topcoat: Interior, latex, semigloss.

END OF SECTION 099123

DIVISION 10 - SPECIALTIES
SECTION 101400 - PLASTIC SIGNS

A. PART 1 GENERAL

1. SECTION INCLUDES

- a. Interior room signs.

2. REFERENCES

- a. ANSI/CABO A117.1 - American National Standard for Buildings and Facilities - Providing Accessible and Usable Buildings and Facilities; Council of American Building Officials; 1992.

3. SUBMITTALS

- a. See Division 1 - General Requirements, for submittal procedures.
- b. Shop Drawings: Indicate sign styles, lettering font, foreground and background colors, locations, overall dimensions of each sign. Develop and Submit Sign Schedule: Consult with Owner and Architect to verify actual text and room numbers for each sign (these will not necessarily match names and numbers shown on the plans). In renovations and additions to existing buildings: coordinate numbering system with existing room numbering system. Make requested corrections and resubmit final sign schedule for approval.
- c. Samples for color selection: Submit actual material samples showing full range of available colors.

4. QUALITY ASSURANCE

- a. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
- b. Standard of Designs:
 - 1) Interior Signs equal to:
 - (a) 2/90 Sign Systems, Flxsigns
 - (b) Creative Signage Systems, Inc., Secure + Spec

5. REGULATORY REQUIREMENTS

- a. Conform to Americans with Disabilities code and ANSI/CABO A117.1 for requirements for the physically handicapped.

6. DELIVERY, STORAGE, AND PROTECTION

- a. Package signs, labeled in name groups.
- b. Store adhesive attachment tape at ambient room temperatures.

7. ENVIRONMENTAL REQUIREMENTS

- 8. Do not install signs when ambient temperature is lower than recommended by manufacturer.
- 9. Maintain this minimum temperature during and after installation of signs.

B. PART 2 PRODUCTS

1. INTERIOR SIGNS

- a. Lightweight and pliable high performance cast PVC vinyl Interior Room Signage with no hard

- edges or movable parts.
- b. Face Color: To be selected from manufacturer's full range of colors
- c. Character Color: To be selected from manufacturer's full range of colors
- d. Edges: Unframed with Radius corners.
- e. Character Font: Helvetica Medium, raised and accompanied by Grade 2 Braille per ADA requirements
- f. Character size and proportion shall comply with ADA requirements.
- g. Quality Standard: Equal to "2/90 Sign Systems, Flxsigns" rectangular signs with permanent fixed ADA lettering and braille characters, and ADA compliant toilet room signs.

2. ACCEPTABLE MANUFACTURERS:

- a. 2/90 Sign Systems - FlxSign
5350 Corporate Grove Blvd. SE
Grand Rapids, MI 49512
800-777-4310
- b. Creative Signage Systems, Inc.
9101 51st Place
College Park, MD 20740
800-220-7446
- c. ASI Sign Systems – In Touch Series
ASI/New Orleans
2713 Ridgelake Drive
Metairie, LA 70002
Phone: 504-704-1000
Fax: 504-704-1006
- d. The above companies are approved as acceptable manufacturers provided that the product submitted conforms to all specification requirements.

C. PART 3 EXECUTION

1. EXAMINATION

- a. Verify that substrate surfaces are ready to receive work.

2. INSTALLATION

- a. Install in accordance with manufacturer's instructions.
- b. Location: Adjacent to latch side of door.
- c. Mounting Height: 60" A.F.F. to centerline of sign.

3. SIGN SCHEDULE - Provide signs at the following locations (and at other locations as indicated):

- a. Interior Signs:
- b. Provide and install one pvc sign adjacent to every exterior door of every room or corridor that leads to the exterior (to meet Fire Marshall/ADA requirements for "low level exit signs"), unless otherwise noted on door schedule. Each sign shall have:
 - 1) Text and braille: "EXIT"
- c. Provide and install one pvc sign adjacent to each new unisex Handicapped toilet room door ("one-holer" toilet rooms.). Signs shall be equal to "2/90 Sign Systems, Flxsigns Series" or "ASI Intouch Series". Each sign shall be 6" x 8", or 8" x 8" and shall have:

- 1) Text and braille as follows:
 - (a) At VISITOR TOILET room, Text and braille: "RESTROOM".
 - (b) At FACULTY TOILET room, Text and braille: "FACULTY RESTROOM".
- 2) Graphic pictograms: Man and Woman symbols and handicapped (wheelchair) symbol

END OF SECTION

DIVISION 10 - SPECIALTIES
SECTION 102800 – TOILET AND BATH ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Public-use washroom accessories.

1.2 COORDINATION

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.
- B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.3 ACTION SUBMITTALS

A. Product Data: For each product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
2. Include anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.

B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.

1. Identify locations using room designations indicated.
2. Identify accessories using designations indicated.

1.4 INFORMATIONAL SUBMITTALS

A. Sample Warranty: For manufacturer's special warranties.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For accessories to include in maintenance manuals.

1.6 WARRANTY

- A. Manufacturer's Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, visible silver spoilage defects.
 - 2. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Design accessories and fasteners to comply with the following requirements:
 - 1. Grab Bars: Installed units are able to resist **250 lbf** concentrated load applied in any direction and at any point.
 - 2. Shower Seats: Installed units are able to resist **360 lbf** concentrated load applied in any direction and at any point.

2.2 PUBLIC-USE WASHROOM ACCESSORIES

- A. Source Limitations: Obtain each type of public-use washroom accessory from single source from single manufacturer.
- B. Toilet Tissue (Roll) Dispenser:
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Bobrick B-2730 single or B-2740 double or comparable product by one of the following:
 - a. ASI-American Specialties, Inc.
 - b. Bobrick Washroom Equipment, Inc
 - c. Bradley Corporation
 - d. Gamco Commercial Restroom Accessories; Bobrick Washroom Equipment, Inc.
 - 2. Description: Single-roll dispenser Double-roll dispenser.
 - 3. Mounting: Surface mounted.
 - 4. Operation: Noncontrol delivery with theft-resistant spindle.
 - 5. Capacity: Designed for up to 6-inch- diameter tissue rolls.
 - 6. Material and Finish: Satin-finish aluminum bracket with plastic spindle.
- C. Paper Towel (Folded) Dispenser:
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Bobrick B-262 or comparable product by one of the following:
 - a. ASI-American Specialties, Inc.
 - b. Bobrick Washroom Equipment, Inc

- c. Bradley Corporation
 - d. Gamco Commercial Restroom Accessories; Bobrick Washroom Equipment, Inc.
 - 2. Mounting: Surface mounted.
 - 3. Minimum Capacity: 400 C-fold or 525 multifold towels.
 - 4. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).
 - 5. Lockset: Tumbler type.
 - 6. Refill Indicator: Pierced slots at sides or front.
 - 7. Provide Bobrick Part No. 262-130 TowelMate accessory to allow narrower paper towels to be dispensed one at a time without falling through the tray opening.
- D. Soap Dispenser:
- 1. Basis-of-Design Product: Subject to compliance with requirements, provide ULINE Model No. H-3905 or comparable product by one of the following:
 - a. GOJO
 - 2. Description: Designed for manual operation and dispensing soap in lather form.
 - 3. Mounting: Vertically oriented, surface mounted.
 - 4. Capacity: 1000 ml.
 - 5. Materials: Plastic.
 - 6. Refill Indicator: Window type.
- E. Grab Bar:
- 1. Basis-of-Design Product: Subject to compliance with requirements, provide Bobrick B-6806x36 and B-6806x42 or comparable product by one of the following:
 - a. ASI-American Specialties, Inc.
 - b. Bobrick Washroom Equipment, Inc
 - c. Bradley Corporation
 - d. Gamco Commercial Restroom Accessories; Bobrick Washroom Equipment, Inc.
 - 2. Mounting: Flanges with exposed fasteners.
 - 3. Material: Stainless steel, **0.05 inch** thick.
 - a. Finish: Smooth, ASTM A480/A480M No. 4 finish (satin).
 - 4. OD: **1-1/2 inches**.
 - 5. Configuration and Length: As indicated on Drawings.
- F. Mirror Unit:
- 1. Basis-of-Design Product: Subject to compliance with requirements, provide Bobrick B-165 or comparable product by one of the following:
 - a. ASI-American Specialties, Inc.
 - b. Bobrick Washroom Equipment, Inc

- c. Bradley Corporation
 - d. Gamco Commercial Restroom Accessories; Bobrick Washroom Equipment, Inc.
- 2. Frame: 20-gauge minimum Stainless-steel channel.
 - a. Corners: Mitered and mechanically interlocked.
- 3. Size: 18 inches x 36 inches.
- 4. Hangers: Manufacturer's standard rigid, tamper and theft resistant.

2.3 MATERIALS

- A. Stainless Steel: ASTM A240/A240M or ASTM A666, Type 304, **0.031-inch**- minimum nominal thickness unless otherwise indicated.
- B. Brass: ASTM B19, flat products; ASTM B16/B16M, rods, shapes, forgings, and flat products with finished edges; or ASTM B30, castings.
- C. Steel Sheet: ASTM A1008/A1008M, Designation CS (cold rolled, commercial steel), **0.036-inch**- minimum nominal thickness.
- D. Galvanized-Steel Sheet: ASTM A653/A653M, with **G60** hot-dip zinc coating.
- E. Galvanized-Steel Mounting Devices: ASTM A153/A153M, hot-dip galvanized after fabrication.
- F. Fasteners: Screws, bolts, and other devices of same material as accessory unit, unless otherwise recommended by manufacturer or specified in this Section, and tamper and theft resistant where exposed, and of stainless or galvanized steel where concealed.
- G. Chrome Plating: ASTM B456, Service Condition Number SC 2 (moderate service).
- H. Mirrors: ASTM C1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

2.4 FABRICATION

- A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.
- B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION OF TOILET, BATH, AND LAUNDRY ACCESSORIES

- A. Install accessories in accordance with manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
 - 1. Remove temporary labels and protective coatings.
- B. Grab Bars: Install to comply with specified structural-performance requirements.

3.2 ADJUSTING AND CLEANING

- A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.
- B. Clean and polish exposed surfaces in accordance with manufacturer's written instructions.

3.3 Toilet Accessory Schedule:

ITEM	MFR.	CATALOG NO.	LOCATION
Toilet Paper Holder	Wausau Paper Bobrick ASI Bradley	Wausau 72200 Silhouette "Dubl-Serv" 2 roll dispenser, or Bobrick B-2740, or ASI 0264-1A, or Bradley 5241-50	One at each toilet (water closet) Mount at 24" A.F.F. & 32" from back wall
Paper Towel Dispenser for all Toilet Rooms	Bobrick ASI Bradley	Bobrick B-262, or ASI 0210, or Bradley 250-15	One at each Toilet Room
Soap Dispenser	Purell / Gojo Bobrick ASI Bradley	Space Saver NXT 1000 ml capacity Bobrick B-2111 (or B-2112 under upper wall cabinets) ASI 0343 (or 0342 under upper wall cabinets) Bradley 6562 (or 6542 under upper wall cabinets)	One at each two lavatories (and sinks) or fraction thereof where lavatories are adjacent to each other, otherwise one at each lavatory and sink. W/ spout at 44" max. A.F.F.

18 X 36 Mirror	Bobrick ASI Bradley	Bobrick B-165, or ASI 0620-A, or Bradley 781	One at each lavatory mount with bottom 40" A.F.F.
Handicap grab bar sets	Bobrick ASI Bradley	Bobrick B-6806-36" & B-6806-42", or ASI Models 3701 x 36" & 3701 x 42", or Bradley 812-001-36 & 812- 001-42	One set at each handicap toilet; mount at 36" A.F.F. (At water closets: 36" long at rear wall & 42" long at side wall; At showers: provide ADA compliant shower grab bar sets.)

END OF SECTION 102800

DIVISION 10 - SPECIALTIES

SECTION 104413 - FIRE PROTECTION CABINETS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Fire-protection cabinets for the following:
 - 2. Fire-protection cabinets for the following:
 - a. Portable fire extinguisher.
- B. Related Requirements:
 - 1. Section 10 44 16 "Fire Extinguishers" for portable, hand-carried fire extinguishers accommodated by fire-protection cabinets

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Show door hardware, cabinet type, trim style, and panel style. Include roughing-in dimensions and details showing recessed-, semi-recessed-, or surface-mounting method and relationships of box and trim to surrounding construction.
 - 2. Show location of knockouts for hose valves.
- B. Shop Drawings: For fire-protection cabinets.
 - 1. Include plans, elevations, sections, details, and attachments to other work.

1.4 COORDINATION

- A. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.
- B. Coordinate sizes and locations of fire-protection cabinets with wall depths.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain fire-protection cabinets, accessories, and fire extinguishers from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Fire-Protection Cabinets: Listed and labeled to comply with requirements in ASTM E 814 for fire-resistance rating of walls where they are installed.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.3 FIRE-PROTECTION CABINET

- A. Cabinet Type: Suitable for fire extinguisher.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. JL Industries, Inc.; a division of the Activar Construction Products Group.
 - b. Larsens Manufacturing Company.
 - c. Potter Roemer LLC.
- B. Cabinet Material: Cold-rolled steel sheet.
- C. Semi-recessed Cabinet: One-piece combination trim and perimeter door frame overlapping surrounding wall surface, with exposed trim face and wall return at outer edge (backbend).
 - 1. Rolled-Edge Trim: **2-1/2-inch** backbend depth.
- D. Cabinet Trim Material: Extruded-aluminum shapes.
- E. Door Material: Extruded-aluminum shapes.
- F. Door Style: Solid opaque panel with frame.
- G. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.
 - 1. Provide projecting door pull and friction latch.
 - 2. Provide continuous hinge, of same material and finish as trim, permitting door to open 180 degrees.
- H. Accessories:

1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire-protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
2. Lettered Door Handle: One-piece, cast-iron door handle with the word "FIRE" embossed into face.
3. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated.
 - a. Identify fire extinguisher in fire-protection cabinet with the words "FIRE EXTINGUISHER."
 - 1) Location: Applied to cabinet door.
 - 2) Application Process: Silk-screened.
 - 3) Lettering Color: Black.
 - 4) Orientation: Vertical.

I. Materials:

1. Aluminum: **ASTM B 221** for extruded shapes and aluminum sheet, with strength and durability characteristics of not less than Alloy 6063-T5 for aluminum sheet.
 - a. Finish: Baked enamel or powder coat.
 - b. Color: As selected by Architect from full range of industry colors and color densities.

2.4 FABRICATION

- A. Fire-Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.
 1. Weld joints and grind smooth.
 2. Miter corners and grind smooth.
 3. Provide factory-drilled mounting holes.
 4. Prepare doors and frames to receive locks.
 5. Install door locks at factory.
- B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles.
 1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum **1/2 inch** thick.
 2. Fabricate door frames of one-piece construction with edges flanged.
 3. Miter and weld perimeter door frames and grind smooth.
- C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

2.5 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's AMP 500, "Metal Finishes Manual for Architectural and Metal Products," for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces of fire-protection cabinets from damage by applying a strippable, temporary protective covering before shipping.
- C. Finish fire-protection cabinets after assembly.
- D. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine walls and partitions for suitable framing depth and blocking where semi recessed cabinets will be installed.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare recesses for semi-recessed fire-protection cabinets as required by type and size of cabinet and trim style.

3.3 INSTALLATION

- A. General: Install fire-protection cabinets in locations and at mounting heights indicated or, if not indicated, at height indicated below:
 - 1. Fire-Protection Cabinets: **42 inches** above finished floor to top of fire extinguisher.
- B. Fire-Protection Cabinets-1: Fasten cabinets to structure, square and plumb.
 - 1. Unless otherwise indicated, provide recessed fire-protection cabinets. If wall thickness is inadequate for recessed cabinets, provide semi-recessed fire-protection cabinets.
 - 2. Provide inside latch and lock for break-glass panels.
 - 3. Fasten mounting brackets to inside surface of fire-protection cabinets, square and plumb.
 - 4. Fire-Rated Cabinets:
 - a. Install cabinet with not more than **1/16-inch** tolerance between pipe OD and knockout OD. Center pipe within knockout.
 - b. Seal through penetrations with firestopping sealant as specified in Section

078413 "Penetration Firestopping."

3.4 ADJUSTING AND CLEANING

- A. Remove temporary protective coverings and strippable films, if any, as fire-protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.
- B. Adjust fire-protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.
- C. On completion of fire-protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.
- D. Touch up marred finishes or replace fire-protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire-protection cabinet and mounting bracket manufacturers.
- E. Replace fire-protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 104413

DIVISION 10 SPECIALTIES
SECTION 104416 - FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.
- B. Related Requirements:
 - 1. Section 104413 "Fire Protection Cabinets."

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher and mounting brackets.

1.4 COORDINATION

- A. Coordinate type and capacity of fire extinguishers with fire-protection cabinets to ensure fit and function.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."
- B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.
 - 1. Provide initial inspection tag for each fire extinguisher
 - 2. Provide fire extinguishers approved, listed, and labeled by FM Global.

2.2 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

- A. Fire Extinguishers: Type, size, and capacity for each fire-protection cabinet and mounting bracket indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Amerex Corporation.
 - b. Ansul Incorporated; Tyco International.
 - c. Babcock-Davis.
 - d. Guardian Fire Equipment, Inc.
 - e. JL Industries, Inc.; a division of the Activar Construction Products Group.
 - f. Larsens Manufacturing Company.
 - g. Nystrom, Inc.
 2. Source Limitations: Obtain fire extinguishers, fire-protection cabinets, and accessories, from single source from single manufacturer.
- B. Multipurpose Dry-Chemical Type in Brass Container: UL-rated 4-A:60-B:C, 10-lb nominal capacity, with monoammonium phosphate-based dry chemical in chrome-plated-brass container.

2.3 MOUNTING BRACKETS

- A. Mounting Brackets: Manufacturer's standard galvanized steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or red baked-enamel finish.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Ansul Incorporated; Tyco International.
 - b. Babcock-Davis.
 - c. Guardian Fire Equipment, Inc.
 - d. JL Industries, Inc.; a division of the Activar Construction Products Group.
 - e. Kidde Residential and Commercial Division.
 - f. Larsens Manufacturing Company.
 - g. Pyro-Chem; Tyco Fire Suppression & Building Products.
 2. Source Limitations: Obtain mounting brackets and fire extinguishers from single source from single manufacturer.
- B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.
1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.
 - a. Orientation: Vertical.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine fire extinguishers for proper charging and tagging.

1. Remove and replace damaged, defective, or undercharged fire extinguishers.

- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.

1. Mounting Brackets: Top of fire extinguisher to be at 42 inches above finished floor.

END OF SECTION 104416

DIVISION 10 - SPECIALTIES

SECTION 107326 – PRE-ENGINEERED WALKWAY COVERS AND CANOPIES

PART I - GENERAL

1.1 WORK INCLUDED

A. Comply with requirements of Contract Documents to provide Pre-engineered Walkway Covers and Canopies. Extent of Walkway Covers and Canopies is indicated on Drawings and by provisions of this Section.

1.2 RELATED DOCUMENTS

- A. Generally the scope of Work and generic type of material is shown on the Drawings, while this Project Manual covers the specific products to be used and conduct of the Work.
- B. Comply with the relative requirements of other Divisions, Sections, the General and Supplementary Conditions and the Drawings, of the entire Contract Documents.
- C. The breakdown of this Project Manual into Divisions and Sections shall not define any limit of work.

1.3 QUALITY ASSURANCE

- A. General: A specialty Subcontractor, capable of showing successful installations similar to work required for this project, shall perform the work of this section.

1.4 SUBMITTALS

- A. Product Data: Submit in accordance with Division 1 Section: SUBMITTALS. Submit manufacturer's product data and installation instructions.
- B. Shop Drawings: Submit in accordance with Division 1 Section: SUBMITTALS. Submit manufacturer's Shop Drawings giving installation instructions and methods of anchoring, sequencing and drainage details. All shop drawings shall be signed and sealed by a registered Civil Engineer (Structural Engineer) having registration in the State of Louisiana.

1.5 HANDLING

- A. General: Deliver all products to job site in accordance with manufacturer's recommendations.

1.6 SEQUENCING

- A. Coordination as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.
- B. Certain sections of the pre-engineered walkway covers and canopy work shall be set in forms for cast-in-place concrete columns and beams; close sequencing/coordination is required for this phase of work.

1.7 WARRANTY

- A. General: Workmanship and materials shall be free from defect. Upon written notice by Owner, at Contractor's expense, make necessary repairs or replacement of defective work and materials, for a period one (1) year.

PART 2 - PRODUCTS

2.1 PRE-ENGINEERED WALKWAY COVERS AND CANOPIES

A. General:

1. Walkway covers and canopies shall be a pre-painted hot-dip galvanized pre-engineered structural steel system complete with tubular columns, pre-engineered roof beams and long-span deck, concealed drainage system and decorative fascias and trim as manufactured by "Childers Carports and Structures, Inc." of Houston, Tx., or Austin Mohawk and Company, Inc., of 2175 Beechgrove Place ; Utica, NY 13501; Toll Free Tel: 800-765-3110; Tel: 315-793-3000.
 2. The system shall be designed to meet a live load requirement of 20 lbs/sf and wind loads per International Building Code (IBC) 2021 and ASCE 7-16 requirements; Design for 130 m.p.h. basic wind speed. Wind-Uplift Resistance: Provide roof panel assemblies that meet requirements of UL 580 for Class 90 wind-uplift resistance with securement enhanced at perimeter and at corners per FM, IBC and ASCE 7-16.
 3. Shop Drawings shall be furnished for Architect's review and General Contractor shall verify all elevations, dimensions and conditions before fabrication.
 4. Panels, fascia, beams and columns shall be designed and sized on the Shop Drawings. The design calculations shall be made and signed by a Structural Engineer (Civil Engineer) Licensed in the State of Louisiana.
- B. Roof deck and trim shall be pre-painted, hot-dip galvanized steel meeting ASTM Specification A-653, Grade 50, 50,000 p.s.i. yield strength. Galvanizing shall meet ASTM Specification A-924, G-90 Class. Paint shall be factory-applied baked polyester with a full coat on color side and a uniform wash coat on reverse. Color: As selected by Architect from manufacturer's full range of standard colors.
- C. Fascia shall have 12" vertical dimension, unless otherwise indicated, and shall have integral box gutter. Provide continuous fascia/gutter at all edges of roof deck equal to "Childers 12" Nassau Trim", unless otherwise indicated.
- D. Roof beams shall meet ASTM Specification A-653 Grade 50, 50,000 p.s.i. yield. Roof beams shall be galvanized and pre-painted. Galvanizing shall meet ASTM Specification A-924, G-90 Class. Paint shall be factory-applied baked polyester. Color: As selected by Architect from manufacturer's full range of standard colors.
- E. Columns shall be square tubes meeting ASTM Specifications A-500, Grade B. Columns shall be hot-dip galvanized after fabrication with a minimum zinc coating of 2 ounces per square foot. Columns shall be pre-painted. Paint shall be factory-applied baked polyester. Color: As selected by Architect from manufacturer's full range of standard colors.
- F. Maximum frame spacing (beams and columns) shall be 10'-0" o.c. unless otherwise indicated. Provide pre-engineered double I-beams for spans over 10'-0" and at cantilevers, sized to suit applicable span and load conditions.
- G. Structural framing (Beams and columns) shall be designed as moment resisting frames and shall be fabricated into one-piece rigid bents capable of resisting lateral wind loads (Diagonal rod or angle bracing shall not be used). Canopies and covered walks shall be self-supporting

independent structures and shall not rely on attachment to other buildings or structures for lateral support.

- H. Width of typical covered walks shall be approximately 8'-0" o.c. out-to-out of columns unless otherwise indicated.
- I. Bottom of fascia at typical covered walks shall be at elevation +8'-8" (above datum elevation 0'-0") unless otherwise indicated.
- J. Concealed Drainage: Water shall drain internally from deck to beams to columns, spouting out at ground level through designated columns.
- K. Deck and fascia/gutter beam shall be factory drilled to insure proper spacing of panels.
- L. Expansion Joints: Structure shall be designed for temperature changes of 120 degrees F., with expansion joints provided if required and shown on shop drawings. Such joints shall have no metal-to-metal contact between deck and beam or clamps. Provide expansion joints to allow 1" movement at all ends of covered walks at connections to buildings.
- M. Beam Supports for Light Fixtures: Provide prefinished galvanized steel channel beams laid flat with open "trough" side up and spanning across width of covered walks and canopies. Provide one channel support at each light fixture location, refer to Electrical Drawings for locations. Light fixtures shall be surface-mounted to the bottom of the channels, and wiring and conduits shall be run concealed within the trough formed by the top side of the channel. Provide pre-punched or pre-drilled holes as required to suit electrical wiring and conduits; coordinate with electrical. Light support beams shall be attached to main beams of covered walks and canopies; do not attach beams or light fixtures to roof deck. Light support beams shall be sized by canopy manufacturer to suit span conditions. Provide shop drawing for approval.
- N. Finish: All steel shall be hot-dip galvanized and pre-painted with factory-applied baked polyester. Color: As selected by Architect from manufacturer's full range of standard colors.
- O. Dimensions: The General Contractor shall verify and approve dimensions and elevations shown on Shop Drawings prior to releasing to manufacturer for fabrication.

PART 3 - EXECUTION

A. INSTALLATION AND CLEANING

- B. General: In strict accordance with manufacturer's instructions. Upon completion, walkway covers and canopies shall be thoroughly cleaned.
- C. Erection: Shall be performed by the manufacturer or his approved installer and scheduled after all concrete, masonry and roofing work in the vicinity is complete and cleaned, except, those portions of the walkway and canopy work which requires integral placing or embedment into the cast-in-place concrete; those sections shall be set by the General Contractor from approved Shop Drawings. Column sleeves (and anchor bolts if required) shall be furnished by the manufacturer and installed by the General Contractor to elevations and dimensions on approved Shop Drawings. Columns and beams shall be aligned with care before columns are grouted. Downspout columns shall be filled to the discharge level to prevent standing water, and downspout deflectors, if required, shall be installed after grouting.
 - 1. Grout shall 2000 p.s.i. minimum compressive strength. Mix by volume, 1 part Portland cement and 3 parts masonry sand. Add water to make pouring consistency and vibrate with a small rod to fill voids. Use and accelerator during cold weather.

2. Extreme care shall be taken to prevent damage or scratching. All workmanship shall be of the very best, with neat miters and fitted joints, as befits an ornamental structure.
- END OF SECTION

DIVISION 12 - FURNISHINGS

SECTION 123623.13 - PLASTIC-LAMINATE-CLAD COUNTERTOPS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Plastic-laminate-clad countertops.
 - 2. Accessories.
- B. Related Requirements:
 - 1. Division 22 Section "Plumbing" for non-integral sinks and plumbing fittings.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings:
 - 1. Plans, sections, details, edge and backsplash profiles, and attachments to other work.
 - 2. Locations and details of joints.
 - 3. Locations and sizes of cutouts and holes for items installed in countertop.
- C. Samples for Initial Selection: Plastic laminates in each type, color, pattern, and surface finish required in manufacturer's standard size.

1.3 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For the following:
 - 1. Composite wood products.
 - 2. High-pressure decorative laminate.
 - 3. Chemical-resistant, high-pressure decorative laminate.
- B. Quality Standard Compliance Certificates: AWI's Quality Certification Program
- C. Qualification Statements: For Installer and fabricator.

1.4 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
 - 1. Shop Certification: AWI's Quality Certification Program accredited participant.

- B. Installer Qualifications: Fabricator of products

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver countertops only after casework and supports on which they will be installed have been completed in installation areas.
- B. Store countertops in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.
- C. Keep surfaces of countertops covered with protective covering during handling and installation.

1.6 FIELD CONDITIONS

- A. Environmental Limitations with Humidity Control: Do not deliver or install countertops until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F and relative humidity between 43 and 70 percent during the remainder of the construction period.
- B. Field Measurements: Where countertops are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.1 PLASTIC-LAMINATE-CLAD COUNTERTOPS

- A. Plastic-Laminate-Clad Countertop Type
- B. Fabricators: Subject to compliance with requirements, available fabricators offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Gremillion Millworks, Alexandria, LA
 - 2. Mardell Products, Manusra, LA
 - 3. Calmar Manufacturing Co., Calmar, IA
 - 4. Case Systems, Inc., Midland, MI
 - 5. Global Casework Mfg, Sugar Land, TX
 - 6. Jericho Woodworks, Sugar, Land, TX
 - 7. LSI Corp of America, Inc, Minneapolis, MN
 - 8. MGC Millwork, LP, Stafford, TX
 - 9. Robert Shaw Mfg. Co., Fort Worth, TX
 - 9. South Texas Woodmill, Inc., Brownsville, TX
 - 10. Stevens Industries, Inc., Teutoplis, IL
 - 11. Terrill Mfg. Co., San Angelo, TX
 - 12. TMI Systems Design Corp, Dickenson, ND
 - 13. Victoria Cabinetworks, Victoria, TX
- C. Quality Standard: Unless otherwise indicated, comply with ANSI/AWI 1236 for grades of plastic-laminate-clad countertops indicated for construction, finishes, installation, and other requirements.
- D. Grade: Custom.

- E. High-Pressure Decorative Laminate: ISO 4586-3, Grade HGS.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. **ABET Inc.**
 - b. **Formica Corporation**
 - c. **Laminart LLC**
 - d. **Nevamar Company, LLC**
 - e. **Pionite; a Panolam Industries International, Inc. brand**
 - f. **Wilsonart LLC**
- F. Chemical-Resistant, High-Pressure Decorative Laminate: ISO 4586-3, Grade HGP, and as follows:
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. **Formica Corporation**
 - b. **Pionite; a Panolam Industries International, Inc. brand**
 - c. **Wilsonart LLC**
 2. Physical Properties: Minimum acceptable chemical-resistance performance to result in no more than four (4) Level 3 conditions when tested with indicated reagents in accordance with SEFA 3.
 - a. Acetone.
 - b. Hydrochloric Acid.
 - c. Sulphuric Acid.
 - d. Xylene.
- G. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
1. As selected by Architect from manufacturer's full range in the following categories:
 - a. Solid colors, matte finish.
 - b. Solid colors with core same color as surface, matte finish.
 - c. Wood grains, matte finish with grain running parallel to length of countertop.
 - d. Patterns, matte finish.
- H. Edge Treatment: Same as laminate cladding on horizontal surfaces.
- I. Core Material: As selected by fabricator to comply with quality standard.
- J. Core Material at Sinks: Veneer-core plywood made with Type II adhesive.
- K. Core Thickness: 3/4 inch.
1. Build up countertop thickness to 1-1/2 inches at front, back, and ends with additional layers of core material laminated to top.

2.2 ACCESSORIES

A. Grommets:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. **Doug Mockett & Company, Inc.**
 - b. **Hafele America Co.**
 - c. **W.W. Grainger, Inc.**
2. Wire-Management Grommets: Circular, grommets and matching caps with slot for wire passage.
 - a. Finish: Molded plastic.
 - b. Outside Diameter: 2 inches.
 - c. Color: Brown.

2.3 WOOD MATERIALS

- A. Wood Products: Provide materials that comply with requirements of referenced quality standard unless otherwise indicated.
- B. Composite Panel Products: Provide materials that comply with requirements of referenced quality standard for each type of countertop and quality grade specified unless otherwise indicated.
 1. Medium-Density Fiberboard (MDF): ANSI A208.2, MR 50.
 - a. Grade 130 or better; complying with performance requirements specified.
 2. Particleboard: ANSI A208.1, MR 50.
 - a. Grade M-2 or better; complying with performance requirements specified.
 3. Veneer-Core Hardwood Plywood: ANSI/HPVA HP-1.

2.4 MISCELLANEOUS MATERIALS

- A. Adhesives: Do not use adhesives that contain urea formaldehyde.
- B. Adhesive for Bonding Plastic Laminate: Type I, waterproof type as selected by fabricator to comply with requirements.
 1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.
- C. Installation Adhesive: Manufacturer's standard product that is recommended for application indicated.

2.5 FABRICATION

- A. Fabricate countertops to dimensions, profiles, and details indicated. Provide front and end overhang of 1 inch over base cabinets. Ease edges to radius indicated for the following:
 - 1. Solid-Wood (Lumber) Members: 1/16 inch unless otherwise indicated.
- B. Complete fabrication, including assembly, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates to receive countertops and conditions under which countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of countertops.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Before installation, condition countertops to average prevailing humidity conditions in installation areas.
- B. Examine shop-fabricated work for completion and complete work as required, including removal of packing.

3.3 INSTALLATION

- A. Grade: Install countertops to comply with same grade as item to be installed.
- B. Assemble countertops and complete fabrication at Project site to extent that it was not completed in the shop.
 - 1. Provide cutouts for appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
- C. Field Jointing: Where possible, make in the same manner as shop jointing, using dowels, splines, adhesives, and fasteners recommended by manufacturer. Prepare edges to be joined in shop so Project-site processing of top and edge surfaces is not required. Locate field joints where indicated on Shop Drawings.
 - 1. Secure field joints in countertops with concealed clamping devices located within 6 inches of front and back edges and at intervals not exceeding 24 inches. Tighten in accordance with manufacturer's written instructions to exert a constant, heavy-clamping pressure at joints.
- D. Countertop Installation:

1. Scribe and cut countertops to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
2. Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.
3. Anchor wall cleating necessary for proper setting for countertops not supported by casework.
4. Install countertops level and true in line. Use concealed shims as required to maintain not more than 1/8-inch-in-96-inch variation from a straight, level plane.
5. Secure backsplashes to walls with adhesive.
6. Seal joints between countertop and backsplash, if any, and joints where countertop and backsplash abut walls with mildew-resistant silicone sealant or another permanently elastic sealing compound recommended by countertop material manufacturer.

3.4 ADJUSTING AND CLEANING

- A. Repair damaged and defective countertops, where possible, to eliminate functional and visual defects. Where impossible to repair, replace countertops. Adjust joinery for uniform appearance.
- B. Clean countertops on exposed and semiexposed surfaces.
- C. Protection: Provide kraft paper or other suitable covering over countertop surfaces, taped to underside of countertop at a minimum of 48 inches o.c. Remove protection at Substantial Completion.

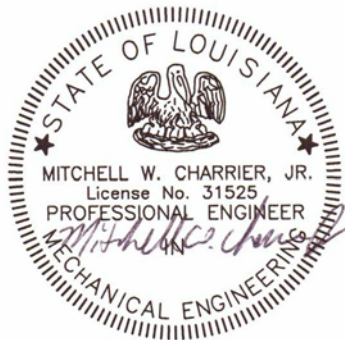
END OF SECTION 123623.13

SEAL PAGE
Verda Elementary School
New Administrative Office – RE-BID
Montgomery, LA

BH&B Project No. 25005/CSW – RE-BID

Mechanical Specifications

200511	GENERAL PROVISIONS FOR MECHANICAL WORK
220420	PLUMBING
230620	AIR CONDITIONING, HEATING AND VENTILATION
230980	TESTING, ADJUSTING AND BALANCING



01/07/2026

Mechanical Engineer

DIVISION 20 – MECHANICAL GENERAL PROVISIONS
SECTION 200511 - GENERAL PROVISIONS FOR MECHANICAL WORK

PART 1. - GENERAL

1.1 SPECIAL NOTICE

- A. Special Notice: Read all **Contract Documents** and become familiar with job, scope of work, type of general construction, architectural, structural, mechanical, fire protection and electrical drawings and specifications; also, become familiar with purpose for which these drawings have been prepared and be cognizant of all details involved. Failure to do so will not be cause for claim after contract award.

1.2 SEQUENCE OF WORK

- A. Before starting work, submit in writing the sequence in which the work is to be performed, outages required and amount of time required for each outage. **All work and timing shall be prior approved by Owner.**

1.3 QUALITY ASSURANCE

- A. All incidental materials, equipment and accessories not specifically mentioned or shown on the Drawings, but required to provide complete operating systems, shall be furnished and installed under this Contract at no additional cost to the Owner.
- B. All systems shall be ready for immediate use when turned over to the Owner.
- C. Verify conditions and check all measurements at job site.

1.4 FEES AND PERMITS

- A. Obtain all permits, inspections, and approvals required by authorities having jurisdiction. Fees and costs incidental to permits, inspections and approvals shall be assumed and paid by Contractor. All utility taps, valves, service lines, meters, regulators, loops and related fees shall be the responsibility of the Contractor.

1.5 UTILITIES FOR CONSTRUCTION

- A. Refer to Section 015000 - Temporary Facilities, for payment of utilities.

1.6 CODES AND PERMITS

- A. Materials and workmanship shall comply with applicable Local, State and National Codes, Specifications, Ordinances, Utility Company Regulations and specified Industry Standards.
- B. In case of difference between Building Codes, Specifications, State Laws, Local Ordinances, Industry Standards, and Utility Company Regulations and Contract Documents, most stringent shall govern. Notify Architect, in writing, of difference. Should Contractor perform any work that does not comply with requirements of latest applicable Building Codes, State Laws, Local Ordinances, Industry Standards, Utility Company Regulations, he shall bear costs of correcting deficiencies.
- C. In addition to Local, Parish and State Ordinances, and Utility Company Regulations, the following Industry Standards and Codes adhered to where applicable:
 - AGA - American Gas Association
 - AMCA - Air Moving and Conditioning Association
 - ANSI - American National Standards Institute

ASHRAE	-	American Society of Heating, Refrigeration, and Air Conditioning Engineers
ASME	-	American Society of Mechanical Engineers
LSPC/IPC	-	Louisiana State Plumbing Code/ International Plumbing Code 2021 with Louisiana Amendments
NBFU	-	National Board of Fire Underwriters
NEC	-	National Electrical Code
NEMA	-	National Electrical Manufacturer's Association
NFPA	-	National Fire Protection Association
OSHA	-	Occupational Safety and Health Act
IBC	-	International Building Code 2021
UL	-	Underwriters Laboratories
NSF	-	National Sanitation Foundation
AWWA	-	American Water Works Association
IMC		International Mechanical Code 2021
IFGC		International Fuel Gas Code 2021

1.7 DRAWINGS AND SPECIFICATIONS

- A. The Drawings issued with these Specifications are basically diagrammatic (unless detailed dimensioned drawings are included) and show only approximate locations of the equipment, fixtures, etc. the exact locations of which shall be subject to the approval of the Architect, who reserves the right to make any reasonable changes in location indicated without extra cost to the Owner.
- B. Obtain from the Project Representative in the field, the exact location of equipment and any other apparatus not definitely located on Drawings.
- C. Contractor shall make his own measurements at the site and in the building during construction and install all systems as the work progresses in such a manner that the equipment, piping, vents, ducts, conduit, etc. will fit in the space provided, maintain head room and, if in finished areas, be as neatly installed, as obscure and "out-of-the-way" as physically possible.
- D. When Contractor submits for review any item of equipment, he shall determine for himself whether or not it will fit in the space provided. Any changes in the size or location of the material or equipment supplied by Contractor, which he may find necessary in order to meet field conditions, or in order to avoid conflicts with the equipment of other trades, shall be brought to the immediate attention of the Architect and approval received before such alterations are made.
- E. All equipment and accessories and its interconnecting piping, etc., shall be installed in such a manner that ample maintenance and passage space shall be provided. If, after installation of any equipment, piping, etc., it is determined that ample maintenance and passage space has not been provided, then rearrange work and/or furnish other equipment at no additional expense to Owner, even though the equipment installed had been reviewed by Architect.
- F. Provide all necessary access panels for equipment, valves, etc. as required for inspection and proper maintenance; also furnish access panels for installation in ceilings and walls under other work as specified herein.
- G. Drawings and specifications are complementary and work called for by one and not other provided as though called for by both. When discrepancies exist between scale and dimension or between Architectural, Structural, Mechanical, and/or Electrical drawings, they shall be called to Architect's attention, whose decision regarding discrepancies shall be final and binding.

- H. Plans are not intended to give exact details as to elevations and routing of pipe, conduits and ducts. Contractor shall physically arrange systems to fit in spaces allocated at elevations intended with proper grades for functioning of systems. Install piping, conduit and duct systems true and square to building construction, located as high as possible against structure in neat and workmanlike manner and concealed in finished areas.

1.8 MANUFACTURER'S DIRECTIONS

- A. Follow manufacturer's directions in delivery, storage, protection and installation of equipment and material. Promptly notify Architect, in writing, of conflict between requirements of Contract Documents and manufacturer's directions, and obtain Architects written instructions before proceeding with work, or bear all costs in connection with deficiencies.

1.9 INSPECTION

- A. Keep competent superintendent or foreman on job and fully responsible for supervision. Periodic visits to the site by Architects, commonly referred to as observations, are only for express purpose of noting general compliance by Contractor with Contract Documents. The Architect's visits are not to be considered inspections for enforcement purposes and shall not relieve the Contractor of his total responsibility for Quality Control and Contract Compliance.
- B. Observations shall not make Architect responsible for providing safe place for performance of work provided by Contractor or Contractor's employees or safety of supplies.

1.10 UTILITIES

- A. Location, size, elevations of sanitary sewer and storm sewer lines, size and pressure of water and gas lines, location of electric and telephone lines and points of service entrance are in accordance with data given Architect by Owner and various responsible department of Parish, Water District, State, and/or Utility Systems operators/owners. Points of connection to utility lines are approximate only. Check and verify data before submitting bid. Include cost of applicable taps, deposits, and other fees.

1.11 RESPONSIBILITY OF CONTRACTORS

- A. Contractor shall clearly understand his responsibility to furnish complete workable installation in accordance with requirements of plans and specifications and be responsible for examining all plans and specifications pertaining to all phases of building construction, and be cognizant of problems involved and adjust work accordingly.

1.12 PROTECTION OF WORK AND MATERIALS

- A. Protect work and material of others from damage and make good damage caused; be responsible for proper protection of equipment, machinery, piping, devices, and accessories delivered to job, maintain them free of rust or excessive dirt, adequately pack and crib as required to maintain "new" until used and installed in project.

PART 2. - PRODUCTS

2.1 MATERIALS AND SUBSTITUTIONS

- A. Materials shall be new, of quality indicated, and manufactured in the United States of America unless otherwise noted. Manufacturer's names are mentioned herein. Products mentioned have proved satisfactory under similar conditions and are acceptable. Other manufacturers of materials of equal quality and performance are provided an equal opportunity to provide quotes to prospective bidders, provided submittal with names and catalog numbers are made and reviewed in writing positively by architect ten (10) days before bids. It is not the intent of these Specifications to discriminate against any manufacturer or product. Manufacturers desiring to submit product for approval as equal to that specified may do so by delivering sample or, in case of larger equipment, specification to Architect. Architect and Owner's representative will examine data and samples submitted for conformance with specifications. Verbal approval not acceptable. Approvals subject to satisfactory performance.
- B. If the specification section has been based on a particular named manufacturer and product, the intent is that the named manufacturer and product serve as a reference standard, is not intended to be proprietary, and recognizes that there will be variations in products offered by the available manufacturers which do not significantly affect the appropriateness of the product or system in question.

2.2 EQUIPMENT IDENTIFICATION

- A. Identify major mechanical and electrical equipment such as air conditioning units, controls, pumps, panel boards, safety switches, starters, etc., by attachment of nameplates constructed from laminated phenolic engraved plastic 3-ply with black surface and white interior, 1/16" thick. Lettering condensed Gothic at least 1/4" high properly spaced for easy and legible reading. Attach plates to equipment by permanent type adhesive or chromium plated screws.
- B. Identify valves on each system, with exception of those normally found exposed in toilet rooms, with valve tag. Tags at least 1-1/2" in diameter and of same material as specified above for nameplates. Use letters to identify each system and numeral on each tag to identify valve. Securely fasten each tag to valve by brass "S" hook. Furnish two (2) neatly typed valve charts showing valve letter and number, valve service and location at which valve may be found. Neatly frame one valve chart in black wood frame under glass and mount as directed in Mechanical Equipment Room; deliver other chart to Architect. Submit copy of chart to Architect for approval before mounting.

2.3 MOTORS

- A. Provide motors required for equipment, fully coordinated with equipment served, of sizes and electrical characteristics scheduled and approved manufacturer listed below or of same manufacturer as equipment they serve.
- B. Three phase motors shall be squirrel cage induction type, standard NEMA frame sizes. Motors one HP and larger shall have integral frames. Enclosures of open drip-proof type or totally enclosed, fan cooled (TEFC) shall be provided as required by service. Motors shall have built-in thermal overloads and rated for 40 degrees C. environment with maximum 50 degrees C. temperature rise for continuous duty at full load (Class A insulation).
- C. Single phase motors capacitor start induction run 115 volt, 60 cycle motors with drip-proof enclosures. Motors shall have built-in thermal overload protection with automatic reset and rated for temperature rise as specified for three phase motors.
- D. Motors shall be designed for normal starting torque and selected for quiet operation free from magnetic hum.

- E. Bearings ball or roller type, double shielded with continuous grease relief to accommodate excessive pressure caused by thermal expansion or over lubrication. Motor bearings shall be factory pre-packed with non-washing lubricant and provided with lubrication fitting arranged to provide easy access when installed on driven apparatus except as noted hereinafter. Permanently lubricated factory sealed motors may be provided in fractional HP sizes where an integral part of piece of an approved apparatus.
- F. Motors shall be provided with adequately sized electrical connection box with threaded hub for attachment of flexible conduit. Where motors are connected to driven equipment by use of v-drive belt, they shall be furnished with adjustable rails and belt guards.
- G. Motors shall not be selected to operate utilizing the safety factor.

2.4 STARTING EQUIPMENT

- A. Starters shall conform to NEMA for industrial control, #1C-1 latest issue. Control voltage line voltage unless specifically indicated to contrary in diagrams or schedules. Manual starters for fractional horsepower single phase motors on-off or snap switch type combined with thermal overload operating on soldered ratchet principle. Switch constructed so it cannot be held closed under sustained motor overload.
- B. Magnetic starters shall have thermal overload protection in each of three phase legs and be solenoid operated. Provide correct size heater element to protect motor and allow it to operate based on motor load and ambient temperatures experienced on individual motor.
- C. Pushbuttons with or without pilot light and hand-off automatic switches standard duty type mounted in NEMA enclosures or in cover of starter as specified or scheduled.
- D. Motor shall be provided with proper starting equipment. Equipment provided and installed by Electrical Contractor unless specifically stated otherwise in mechanical specifications. Motor starting equipment provided of same manufacture unless such starting equipment is integral part of equipment on which motor is mounted.
- E. Starters, across the line, two speed across the line, reduced voltage or manual, and accessories such as pushbuttons, pilot lights, hand-off automatic switches, etc., shall be provided and installed by Electrical Contractor unless otherwise specified in Mechanical Specifications.

2.5 PIPE HANGERS, SUPPORTS AND PENETRATIONS

- A. See Architect's details for specific hangers and bridging.
- B. Plumbing systems piping shall be installed without undue strains or stresses and provisions shall be made for expansion, contraction and structural settlement. **Plumbing Code shall apply as a minimum; however, this specification shall govern where the minimum is exceeded herein.**
- C. Provide properly sized hangers to fit pipe or insulation around pipe. Hangers shall bear name of manufacturer. Type of hangers for different services as follows:
 - 1. For steel piping, malleable iron, split ring hangers with swivel, hexagonal adjuster. Upper portion of adjuster threaded to accept hanger rod. For cast iron pipe, heavy duty formed steel clevis hanger.

- D. For copper tubing or piping, hangers as specified above, except copper plated wherever in contact with copper pipes.
- E. Hangers, inserts, beam clamps, and riser clamps of same manufacturer.

2.6 SLEEVES

- A. Pipe and conduit passing through building structure shall be free from structure and shall pass through sleeve.
- B. Above grade sleeves shall be constructed from galvanized steel and flush on both sides of surface penetrated. Sleeves sized to allow free passage of pipe to be inserted and when pipe is insulated, sleeve large enough to clear insulation.
- C. Fabricate from galvanized sheet-metal closed with lock-seam joints. For following pipe sizes, provide gauge indicated: 3" pipe, and smaller, 20 gauge; 4" to 6" pipe, 16 gauge; over 6" pipe, 14 gauge.
- D. Pipe Sleeve Caulking: N.F.P.A. approved materials shall be used to completely close spaces between pipes and sleeves to prevent passage of smoke, fire or water to preserve integrity of fire rating and to prevent leakage between floors. Seal perimeter of pipe sleeves at joints between sleeves and walls and floors.
- E. Sealants: As specified in Section 079200.

2.7 FLOOR AND CEILING PLATES

- A. Provide chromium plated escutcheon on each pipe, conduit or hanger rod penetrating wall, floor and ceiling. Size escutcheons to fit snugly to all lines and fit snugly over insulation. Provide plates with set screws to fit snugly against snugly against finished structural surface.

2.8 ACCESS DOORS

- A. Contractor shall provide access doors as required to operate and service all concealed equipment and valves of size indicated and/or required for proper access to equipment. Include access strap, concealed hinges, screwdriver locks and openings to 180 degrees. See Section 083113.

PART 3. - EXECUTION

3.1 INSTRUCTIONS

- A. The Contractor shall notify the Architect if discrepancies occur between plans and specifications. The Architect will clarify and advise the Contractor. The Contractor shall follow the instructions promptly, resuming work without additional cost to the Owner.

3.2 COOPERATION AND CLEAN UP

- A. Cooperate fully with others on job to keep project in clean and safe condition. At end of each day, properly store tools, equipment and materials and remove tools, equipment, surplus materials and debris.

3.3 SCAFFOLDING, RIGGING AND HOISTING

- A. Provide scaffolding, rigging and hoisting as required for complete installation of work.

3.4 EXCAVATION AND BACKFILL

- A. In order to facilitate its purpose, L.R.S. 40:1749.13 states that no person shall excavate or demolish without first ascertaining the location of underground utilities by serving telephonic notice to a regional notification program. In the State of Louisiana, the regional notification program is Louisiana One Call (formerly DOTTIE). In order to serve notice of excavation, this program can be reached by calling 1-800-272-3020.
- B. **Excavation and backfill for installation of electrical, plumbing and HVAC work shall be furnished and accomplished by each trade. See Division 31.**
- C. Excavate trenches for underground piping to required depths. Bottoms of trenches tamped hard and graded to secure maximum fall. Excavate bell holes to assure pipes resting for entire length on solid ground. Should rock be encountered, excavate to depth of 6" below bottom of pipe and before laying pipe, space between bottom of pipe and rock surface filled with gravel thoroughly tamped. Lay pipe in trenches dug in fill and support down to load bearing undisturbed soil. After testing, inspection and approval by Architects and local inspecting authorities, backfill trenches with clean dirt as follows:
 - 1. Install backfill in layers 6" deep, adequately tamped and wetted or flushed before second layer of earth is laid in place. Continue process until trenches are filled. Use no roots, rocks or foreign materials of any description in backfilling trenches. Furnish additional material required. Remove excess materials and debris from site.
 - 2. **All earthwork (excavation, backfill material, compaction, etc.) under the building shall be in accord with Division 31.**
- D. Excavation and backfilling shall be done in manner so as not to disturb adjacent structures. Furnish any shoring as required.

3.5 ELECTRIC WIRING OF MOTORS AND EQUIPMENT

- A. Unless specified hereinafter in Sections 220420 or 230000, Mechanical Contractor shall be responsible for wiring all automatic temperature controls, interlock and interconnecting wiring for control system. Electrical Contractor shall provide power wiring through the disconnect switch, starter and to the motor.
- B. Mechanical Contractor shall furnish all motors and complete wiring diagrams showing power wiring, interlock wiring and temperature control wiring. Submit diagrams to Architect for approval within thirty (30) days after submittals for equipment have been approved. Diagrams based on approved equipment and complete and integrated drawings, not series of manufacturer's individual diagrams. After diagrams have been approved by Architect, furnish copies to Control Wiring Contractor and follow in detail.
- C. Electrical design and drawings are based on equipment scheduled and should equipment be submitted for approval requiring changes to electrical design for which extra costs are involved, such costs borne by those providing equipment requiring change.
- D. At job completion, meet with representative of Architect and Owner at job site and jointly inspect, check out and test control circuits, interlock circuits and power circuits to each piece of equipment.

3.6 CUTTING AND PATCHING

- A. Notify General Contractor sufficiently ahead of construction of floors, walls, ceilings, roof, etc., of openings required and set sleeves required at proper times so as not to hold up progress of job.
- B. Under each section of the Specifications, perform all cutting of existing walls, ceilings, floor or roof of existing structures as may be necessary for the installation of the work, except holes in concrete or masonry walls and floors. All holes in concrete, marble or masonry structures shall be cored with a diamond bit core drilling machine. No holes shall be cored thru beams, joists or columns. Every safety precaution shall be taken in coring holes to prevent electric shock should any energized circuits be encountered. Cutting and coring of holes in existing structure shall not be done without prior approval of the Architect.
- C. Caulk space full between sleeves and pipe or conduit, insulated, or plain, above grade, with material specified in Division 7 Section 078413 Fire stopping, installed as per Manufacturer's written instruction, to provide a positive smoke and fire seal. Where holes have been cut in masonry for placing sleeves, the space between cut openings and sleeves shall be sealed.

3.7 PIPE HANGERS AND SUPPORTS

- A. See Architectural details for specifics of this job.
- B. **Plumbing Code shall apply as a minimum; however, this specification shall govern where the minimum is exceeded herein.**
- C. Suspend horizontal runs of piping from construction above by approved hangers spaced as scheduled. Install supports and hangers to permit free expansion and contraction in piping systems. Where necessary to control expansion and contraction, piping guided and firmly anchored. No piping self-supporting nor supported from equipment connections.
- D. Support piping by formed steel riser clamps. Fasten hangers to construction above by formed steel or cast iron concrete inserts in concrete construction and by malleable iron beam clamps under steel construction.
- E. Provide space hangers for support of piping at not greater than on following centers; however, the spacing required by the Plumbing Code shall not be exceeded.

<u>Size</u>	<u>Ft. on Centers</u>
2" and 3/4"	6
1"	7
1-1/4"	9
1-1/2"	10
2" and larger	12

- F. Separately support each fitting and length of cast iron pipe by installing pipe hanger immediately behind hub. Generally, hangers on 5 foot centers, but if 10 foot lengths of cast iron pipe are used, hangers may be spaced 10 feet on center.
- G. On wrought iron, steel or copper piping, provide hanger within two (2) feet of each elbow or tee. Provide additional supports for valves, strainers, and other equipment in pipe line.
- H. Size hanger rods for support of hangers as follows:

<u>Piping Sizes</u>	<u>Rod Sizes</u>

3/4" to 2"	3/8"
2-1/2" thru 3-1/2"	2"
4" thru 5"	5/8"
6"	3/4"
8" thru 12"	7/8"
14" thru 16"	1"

- I. All pipe shall be supported in a manner such as to prevent excessive stress and variations in supporting forces onto the supporting structures. Anchor and hang in such a way as not to interfere with natural expansion and contraction and the anchors and guides shall be capable of withstanding such forces imposed on them by the expansion and contraction of piping.
 - 1. All vertical piping extending from floor to floor shall be supported at each floor with approved riser floor clamps.
- J. Each pipe passing through masonry and/or concrete construction shall be free from the structure and shall pass through a sleeve.
- K. Each sleeve shall extend through its respective floor, wall, etc, and shall be cut to be flush with each outer finished surface, except sleeves in floors, which shall extend one and one half inches above finished floor unless noted otherwise.
- L. Unless otherwise noted, the inside diameter of all sleeves shall be a minimum of one inch larger than the outside diameter of the pipe or conduit it serves, or a minimum of one inch in diameter larger than the outside diameter of the insulation or insulated lines.
- M. Fire protection piping shall be supported in accord with NFPA applicable Standards.
- N. Caulk space full between sleeves and pipe or conduit, insulated, or plain, above grade, with approved sealant, installed as per Manufacturer=s written instruction, to provide a positive smoke and fire seal. Where holes have been cut in masonry for placing sleeves, the space between cut openings and sleeves shall be sealed.
- O. Where exposed piping passes through walls, ceilings, floors or partitions, provide approved chromium plated, pressed steel escutcheons.

3.8 SEALANT

- A. Sealant shall be provided where required. **Applicable sections of this Project Manual shall apply.**
- B. Caulk space full between sleeves and pipe or conduit, insulated, or plain, above grade, with approved sealant, installed as per Manufacturer=s written instruction, to provide a positive smoke and fire seal. Where holes have been cut in masonry for placing sleeves, the space between cut openings and sleeves shall be sealed.
- C. Seal space full between sleeves and pipe ducts or conduit, etc., insulated, or plain, above grade to provide a positive seal and match rating of wall, floor or ceiling. Where holes have been cut in masonry for placing sleeves, the space between cut openings and sleeves shall be sealed.
- D. Where exposed piping passes through walls, ceilings, floors or partitions, provide approved chromium plated, pressed steel escutcheons.

3.9 START-UP, TEST AND ADJUSTMENTS

- A. Purpose of starting, testing and adjusting equipment is to put it into final operation for Owner's use and benefit. Furnish competent technician experienced in start-up, adjusting, testing and balance, to spend adequate time with project to properly test, adjust and put equipment into proper operation.
- B. Before start-up of pressure vessels, secure inspection and approval from Owner's insurer and start-up only in presence of Owner's insurer. Should insurer require work not included in Contract Documents, Owner may order such work performed; cost to be borne by Owner.
- C. Prior to start-up, the installation shall be checked and certified by Authorities that all is in accord with Codes hereinbefore specified and the State of Louisiana inspector.

3.10 QUIET OPERATION

- A. Install equipment in such manner that under all conditions of load, it will operate without sound or vibration objectionable in occupied spaces.

3.11 OPERATION PRIOR TO COMPLETION

- A. When each and every piece of mechanical equipment is ready to operate, if it is to advantage of Owner or project construction to operate equipment, Mechanical Contractor shall allow operation without obligating Owner for full acceptance. **(See General Conditions.)**
- B. Owner shall furnish operation personnel to supervise over-all operation of machinery, but it shall remain Contractor's responsibility until final acceptance.

3.12 DRAWINGS

- A. Because of small scale of drawings, all offsets, fittings, and accessories have not been indicated. Carefully investigate structural conditions, walls, furring and chase locations and make actual measurements on job, so that duct work, piping and equipment will fit.

3.13 PROGRESS OF WORK

- A. Coordinate work with work of other trades. In general, duct work shall take preference over piping except where piping must be maintained at specified slope.

3.14 PAINTING AND PIPE IDENTIFICATION

- A. All piping (bare and insulated), bare steel frames, etc, that is not concealed shall be painted. **See Division 9.**
- B. Material and equipment provided with factory finishes that have rusted, abraded or otherwise damaged finish conditions touched up or painted as required in accordance with Division 9 and factory recommendations to restore finish to original new finish.
- C. After all piping systems have been completed, including insulation and painting, they shall be identified properly through use of mastic type permanent markers (no stenciling) indicating fluid and direction of flow. All markers shall conform to ANSI A13.1 (latest version) and shall be placed at maximum of 20' intervals. Marker tape shall be of variable temperature, waterproof grade cloth and self-adhering type.
- D. All piping both exposed and concealed in accessible ceiling areas, chases, or tunnels, shall be marked and color coded as hereinafter specified.

- E. All marker and color code pipe banding tape shall be All-Temperature Vinyl Cloth with extra strength adhesive.
- F. Apply pipe marker at each valve to show proper identification of pipe contents and use an arrow marker with each pipe content marker in the direction of the flow.
- G. Apply pipe marker and arrow marker at every point of pipe entry or exit where line goes through wall and at each riser and AT@ joint.
- H. Apply pipe marker and arrow marker every 20 feet on long continuous lines.
- I. Apply all markers on the lower two quarters of the pipe and where view is unobstructed so that they can be read at a glance from floor level.
- J. All pipe markers and arrow markers shall have same color background as bands.
- K. Letter and arrow height shall be 2 inches for 3-inch diameter pipe or larger and 1 inch for pipe diameter under 3 inches.
- L. All piping shall be color coded with 2-1/4 inch wide color code pipe banding tape on 20 feet-0 inches maximum centers. Pipe shall be color coded as follows:

<u>Legend</u>	<u>Colors</u>	<u>Piping or Insulation Background</u>	<u>Directional Marker Band Color</u>
Domestic Cold Water or Make-Up Water	Dark Blue	Green	White
Domestic Hot Water 140°F / 110°F	Brown	Yellow	Yellow

- M. On bare pipes, painted pipes, and pipes insulated with a firm covering, pipe banding tapes matching the background color of the marker shall be used for 360° color coding. After applying the pipe marker, wrap pipe banding tape around pipe at each end or marker. Tape should cover 2 inches of each end of marker and should overlap approximately 2 inch to 1 inch on itself.
- N. On chalky and loose insulation, soft, porous, fiber filled or fiberglass coverings, a spiral wrap of the pipe banding tape shall be made around the circumference of the pipe. Sufficient spiral wraps should be made to accommodate the horizontal dimension of the pipe markers.

3.15 OPERATING AND MAINTENANCE MANUALS AND INSTRUCTIONS

- A. Provide three (3) bound copies of operating and maintenance (O&M) manuals for all mechanical and electrical equipment.
- B. Submit three (3) typed copies of air conditioning, heating and ventilation systems operating instructions, one (1) set to be framed and presented to Owner. Following Architect's approval, install in Equipment Room.

3.16 FINAL INSPECTION

- A. Architect will not make final observation until work of all trades is fully completed and following documents are furnished:

O&M Manuals

Certificate of Acceptance from local plumbing inspector.

Certificate of Acceptance from local electrical inspector.

Certificate of Installation from State Inspector for Heaters and Boilers.

Letter certifying temperature controls are operating properly.

Other written performance data subsequently called or referenced herein.

3.17 GUARANTEE

- A. Guarantee materials and workmanship for one (1) year from date of filing of Acceptance in Courthouse. Repair defects due to faulty materials, method of installation, or workmanship or replace promptly with least inconvenience and without expense to Owner and at time designated by Architect.
- B. Provide extended warranties as specified hereinafter, or as shown on Plans.

All guarantees, inspections, certifications, etc., shall be incorporated in the maintenance manuals which are turned over to Owner.

3.18 AS BUILTS

- A. Provide as-built reproducible drawing, and specifications, each system as specified as required by the Contract Documents.

3.19 MECHANICAL EQUIPMENT ROOMS SHOP DRAWINGS

- A. Submit for approval prior to installation a complete layout, to scale drawing (not less than 1/4" = 1') of the rooms, actual equipment to be used and piping. Also, sections as required to indicate piping and equipment elevations.

END OF SECTION 200511

DIVISION 22 - PLUMBING
SECTION 220420 - PLUMBING

PART 1. - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this Section.
- B. General Provisions for Mechanical and Electrical Work and all relevant documents are part of this work. References to specific paragraphs are intended to point out specific items to the Contractor, but in no way relieve him of responsibility of complying with all relevant parts of entire specification.

1.2 DESCRIPTION OF WORK

- A. Work of this Section comprises furnishing of all materials, equipment, tools, labor and transportation necessary for complete installation of plumbing systems shown on drawings and hereinafter specified. **Coordinate all work, fee payments, inspections by authorities having jurisdiction, utility connections, digging, etc. With -- domestic water: West Grant Water Association (318-252-7269), & Sewer: Grant Parish Permit Office/ OPH Sanitarian/ Public Health Inspector (318-627-3133)/ Rapides Parish Planning Commission, and officials at Grant Parish School Board (GPSB), Principal of Verda Elementary School.**
- B. Work includes, but is not limited to, the following pipe systems:
 - Sanitary Soil, Waste and Vent
 - Gravity and Force Main Sewer
 - Domestic Cold Water
 - Domestic Hot Water
 - Providing Service and Making Connections to All Equipment Furnished by Others as Indicated on Plans, including, but not limited to, Architectural and Food Service.
- 1. Refer to Division 26 sections for electrical connections to water coolers and other plumbing fixtures and equipment; not work of this Section.

1.3 QUALITY ASSURANCE

- A. **Installation shall be in accord with the requirements of the State of Louisiana and all applicable Codes and Standards.**
- B. Manufacturers: Firms regularly engaged in the manufacture of plumbing fixtures of the type, style and configuration required, whose products have been in satisfactory use in similar service for not less than 5 years.
- C. Plumbing Standards: Comply with applicable portions of International Plumbing Code Year 2021 with Amendments pertaining to materials and installation of plumbing. These are the minimum. Note that these specifications and plans require design and installation above the minimum.

PART 2 – PRODUCTS

2.1 VALVES AND COCKS

- A. Valves and cocks of specification grade shall be furnished and installed in all branches serving more than one piece of equipment or each group of plumbing fixtures, on both sides of equipment such as pumps, tanks, etc., for shut-off of branch mains and where indicated. Provide hot and cold water stop valves and gas cock at each item being served. Where piping is chrome plated, valves shall have same finish. Valves for similar service shall be of one manufacturer. Pressure rating specified for valves is steam working pressure. Service line valves shall be approved by applicable Utility Company.
- B. Provide access doors where necessary in accordance with Section 083113, and as required to operate and service all concealed equipment and valves. Doors shall be of tamper-proof design.
- C. Valves and cocks shall be supported as specified in Section 200511.
- D. Valves placed underground shall be enclosed in cast iron commercial type valve box with appropriate marking on cover.
- E. Gate Valves:
 - 1. 2" and smaller, bronze, screwed, 200# WOG gate valve, solid wedge disc and rising stem, Crane No. 428, Nibco T-111, Powell 500-S, or approved equal.
 - 2. 2-1/2" and larger, iron body, flanged, 200# WOG gate valve, bronze trim and rising stem, Crane No. 465-1/2, Nibco F617-0, Powell 1793, or approved equal.
 - 3. Solder-joint gate valves 3" and smaller, bronze, solder-joint, 200# W (200E F. max.), solid wedge disc and rising stem, Crane No. 1334, Nibco S-111, Powell 1821-S, or approved equal.
- F. Globe Valves:
 - 1. 2" and smaller, bronze, screwed, 300# WOG globe valve, replaceable composition disc suitable for hot water to 200E F. maximum, Crane No. 7, Nibco T-235Y, Powell T150, or approved equal.
 - 2. 2-1/2" and larger, iron body, flanged 200# WOG globe valve, replaceable composition disc suitable for hot water to 200E F. maximum, Crane No. 359, Nibco F 718-SW, Powell 301, or approved equal.
 - 3. Solder-joint globe valves 2" and smaller, bronze, solder-joint, 200# W globe valve, replaceable composition disc suitable for hot water to 200E F. maximum, Crane No. 1310, Nibco S-211-YW, Fairbanks 0582, or approved equal.
- G. Ball Valves:
 - 1. Shall be Two-Piece, Full Port, 600 psi Bronze Valve for general purpose applications. Cast bronze body and end piece, blowout proof silicon bronze stem. Shall have insulated handle.
 - 2. Full port for high flow coefficient.
 - 3. Dezincification resistant silicon bronze stem.
 - 4. Adjustable packing.
 - 5. Metal to metal end-piece to body seal.
 - 6. Shall be specified as MSS S110, ANSI B1.20.1 (threaded end) and ANSI B16.18 (solder end).
 - 7. Applications are for hot and cold water, and HVAC.

8. Approved manufacturers are Nibco T-585-70 or Watts B6080.

H. Check Valves:

1. 2" and smaller, bronze, screwed, Y-pattern 200# WOG swing, bronze trim, Crane No. 34, Nibco T413B, Powell 578, or approved equal.
2. 2-1/2" and larger, iron body, flanged 200# WOG swing, bronze trim, Crane No. 373, Nibco F918-B, Powell 559, or approved equal.
3. Solder-joint check valves 2" and smaller, bronze, solder-joint, Y-pattern 200# WOG (200E F. max.) swing, Crane No. 1342/1303, Nibco S-413W, Powell 1825, or approved equal.

I. Strainers:

1. 2" and smaller, iron body, screwed, Y-pattern 200# WOG sediment separators, 20-mesh Monel screen, Crane No. 988-1/2, Metraflex Style S, McAlear Style S, or approved equal.
2. 2-1/2" and larger, iron body, flanged, Y-pattern, 200# WOG sediment separators, 20-mesh Monel screen, Crane No. 989-1/2, Metraflex Style S, McAlear Style F-2, or approved equal.

- J. Balancing Valves: Domestic hot water balancing valves shall be bronze calibrated balanced type with provisions for connecting portable differential pressure meter. Connections to have built-in check valves. B & G CB series or Watts CSM series.

2.2 UNIONS

- A. Use on all items of equipment. Unions must be accessible. Wrought copper solder type ground unions to 2". Steel pipe, use brass to iron seat malleable iron-ground joint, 150-pound unions or union fittings, galvanized or black (depending on pipe), up to and including 3" sizes. Above 3", 3 parts brass to iron seat malleable iron-ground joint flange unions, 150 pounds.

2.3 TRAPS

- A. Where "P" traps are not specified as chromium plated brass, use cast iron. DWV copper may be used above grade.

2.4 WASTE ARMS

- A. DWV copper piping for lavatory and sink connections between soil stack and trap drain fittings as required by Codes.

2.5 AIR CHAMBERS

- A. Provide commercial grade water hammer arrestors on each hot and cold-water pipe to each plumbing fixture or behind each group of plumbing fixtures. Size and installation shall be in accord with manufacturer's recommendations based on fixture units. Arrestors shall have a full building life-time performance guarantee. Josam "Shock-Absorbers", Wade "Shokstops", J. R. Smith "Water Hammer Arrestors", Precision Plumbing Products, "Water Hammer Arrestors".

2.6 CLEANOUTS

- A. Provide cleanouts as indicated and as required by Codes. All above ceiling shall be brought up to finished floor level.

2.7 DRAINS AND CLEANOUTS

- A. Provide drains and cleanouts with cast iron bodies and screwed or caulked connections as indicated and specified. Provide deep seal cast iron "P" traps at floor drains connected to sanitary sewer. Drains above finished ceiling and roof drains shall have a sheet of flashing lead extending beyond pipe opening in all directions with clamping device. Provide traps as indicated, deep seal.

FD-1 Floor Drain: Wade W-1100-5, JR Smith 2005-LA-NB, or equal, cast-iron body with flashing collar and adjustable nickel-bronze ADA strainer; 5" strainer for 2" outlet, 6" strainer for 3" outlet, 7" strainer for 4" outlet. Josam 30000 Series, equal. Ty-Seal or as required for piping assembly. **Provide trap primer assembly and deep seal trap.**

FD-2 Floor Drain: Wade W-1100-ER, extended rim for indirect waste, or equal Zurn ZN415 with Z400I Type I round polished bronze strainer with raised lip. Cast iron floor drain, adjustable polished brass round top with 3.5"x9" funnel assembly. Clamping device required above First Floor. Josam 30000 series equal. Ty-Seal or as required for piping assembly. **Provide trap primer assembly and deep seal trap.**

Floor Cleanouts: Wade W-8000, cast iron "Leveleze" adjustable floor cleanout with round Nikaloy top, threaded brass closure plug same size as pipe. Ty-seal or as required for pipe assembly. Josam Series 55000-1, equal. **Design for floor finish indicated on Architectural plans.**

Wall Cleanouts: Wade W-8560, cast iron cleanout with tapered body, bronze plug, polished satin cast Nikaloy square access cover with anchor lugs. Vandalproof screws. Josam Series 58640-COT or equal.

- B. All access plates and securing devices shall be **approved** prior to purchase.
- C. **Provide trap primer at each floor drain and hub drain as required by the currently adopted Louisiana State Plumbing Code (IPC with La. Amendments).**

2.8 FLOOR DRAIN TRAP PRIMING DEVICES

- A. Priming devices shall be Precision Plumbing Products, Inc. automatic brass trap primers activated by a drop in building water pressure. Model P2-500 or Mi-Fab M2-500 for one (1) or two (2) drains with distribution unit, and Model P1-500 or Mi-Fab M1-500 with distribution unit priming three (3) to eight (8) drains (some adjustment required), located anywhere in an active cold fresh water line, as indicated on drawing and required by Code. Uniform Plumbing Code listed. ASSE Standard #1018.
- B. Provide gravity type primers, complete assembly, as specified with fixture or indicated on Plan. Neat and approved arrangement required. Insulate same as provided for handicapped lavatory piping, sized for primer pipe.
- C. All trap primers (pressure, gravity & electronic) shall have in-line shut-off valve upstream of unit at unit's water line branch. See specification items on applicable priming devices.

2.9 WALL HYDRANTS

- A. Outdoor Exposed Flush Type: Heavy duty, high-flow double-check backflow-protected, automatic draining, non-freeze recessed type with hydrant, lockable door, chrome plated brass finish on brass casting, hardened stainless steel operating stem, permanent type brass valve body and solid brass operating rod, 3/4" hose thread nozzle, 3/4" female i.p.s. inlet, one-piece valve plunger to control both flow and drain functions, loose key to operate hydrant, integral vacuum breaker constructed so that hose cannot be connected if vacuum breaker is removed. Woodford box flush type B67 or equal. ASSE 1052. See Arch. Plan and related section for available wall thickness. Model selected and piping shall fit within the wall cavity.

2.10 HOSE BIBBS

- A. Inside Type: Heavy duty brass wall faucet, rough chrome finish, 3/4" i.p.s. female flanged inlet connection, 3/4" hose thread outlet, anti-siphon, Metal wheel handle operated, adjustable packing nut, integral vacuum breaker constructed so that hose cannot be connected if vacuum breaker is removed. Woodford 24-P or Prier Brass 135-CP.

2.11 PIPING

- A. Provide piping systems as indicated on the plans and as specified herein. Refer to Section 220511 for applicable work to all piping installations to be provided by Contractor, which shall include, but is not limited to, domestic hot and cold water, natural gas, roof and storm drain, sub-surface and sanitary drain. Underground piping shall be arranged in a manner so as to allow application of specified insulation. Provide restraints as required based on routing (submit for approval prior to work). All plastic piping buried underground shall have tracer wire and warning tape, per APWA Std.; detectable warning tape acceptable for both.
- B. Materials:
1. Domestic Hot and Cold Water: Pipes and fittings utilized in drinking water systems shall be lead free. Within Building: Through 4", Type "L" copper above ground or slab; Type "K" copper underground or beneath slab or fill; fittings wrought copper or cast brass. Exterior: Cold water thru and including 4" shall be equal to IPS Class 200 SDR-21 domestic water PVC pressure pipe ASTM D-2241, ASTM D-3139/F477. Exterior service and piping above 4" shall be PVC conforming to ASTM D-1784 and D-2241 with integral bell gasketed joint conforming to ASTM D-3139; pipe and fitting shall meet requirements of AWWA C-900. Exterior service and piping above 4" may be AWWA C151/ A21.50 and C152/ A21.51, Class 53 thickness/ 350 psi pressure Class, C104/ A21.4 cement-lined and standard asphaltic coal tar coated, ductile iron water pressure pipe with mechanical joints as approved by Water Works District No. 3. The iron shall be fully annealed Grade 60-42-10. See Plan for designated system. Pipe comply with NSF. Refer to Division 33.
 - a. Domestic cold-water, hot water, trap primer lines penetrating concrete slabs shall be wrapped with "Protect-O-Sleeve" vinyl flexible tube, as manufactured by Oatey, or equivalent. Sleeve shall have a minimum thickness of .025".
 - b. Domestic hot water lines shall be insulated at all penetrations through slab. Domestic cold-water piping within 5'-0" of building may be Schedule 40 PVC plastic pipe with solvent welded joints.
 - c. Provide thrust blocks all at changes in direction. Installation shall be in accordance with manufacturer's recommendations.
 - d. Trap Primer Drain Piping: Type "K" copper above and below floor, with slope to floor drain connection. No joints below slab.
 - e. **WARNING!** Never test with or transport/store compressed air or gas in PVC pipe or fittings, as this may result in explosive failures and cause severe injury or death.
 - f. **This** specification covers PVC pipe and fittings for pressure applications. This system is intended for pressure applications where the operating temperature will not exceed 140° F.
 2. Equipment Drains: Type "K" copper. All underground and underslab lines - same as for metal "Building Sanitary Drain and Vent" piping. Silver solder below slab, only if prior approval by Architect.

3. Building Sanitary Drain and Vent: Service weight cast iron. At Contractor's option, copper drain tube and fittings, Type DWV, may be used above slab; joints to be in accordance with manufacturer's recommendations. No-hub with stainless mechanical coupling as required for allowed wall cavity. Schedule 40 PVC with fused joints acceptable for drain and vent, **except in HVAC plenums, rated partitions, and where waste water discharge is above 140° or as noted on plans. In the event the sanitary vent extension thru fire rated partitions, plenum space above ceiling, vent shall be cast iron. If PVC is utilized for sanitary vent piping, transform to cast iron a minimum of (3) three feet prior to entering plenum spaces or fire rated walls, or fire rated floor/ceiling, and as noted.**
4. Building Sanitary Sewer (Exterior beyond 5' Outside of Building): Plastic Sewer Main (PSM) gravity pipe, PVC Non-Pressure ASTM D3034, SDR 35, integral bell & mechanical locked in gasket. Pipe shall be manufactured from virgin rigid PVC (polyvinyl chloride) vinyl compounds with a cell class of 12364 as identified in ASTM D 1784. The requirement of this specification is intended to provide pipe suitable for non-pressure drainage and surface water. PVC SDR 35 PSM pipe shall conform to ASTM D 3034 for pipe with a minimum pipe stiffness of 46psi at 5% deflection. Pipe provided with integral bell and mechanical locked in gasket. This system is intended for gravity applications where the operating temperature will not exceed 140°F. Installation shall comply with the latest installation mfg. instructions, and shall conform to all applicable plumbing, and building code requirements. Buried pipe shall be installed in accordance with ASTM D 2321 and ASTM F 1668. The system shall be protected from chemical agents, fire-stopping materials, thread sealant, plasticized-vinyl products or other aggressive chemical agents not compatible with PVC compounds. The system shall be hydrostatically tested after installation **WARNING!** Never test with or transport/store compressed air or gas in PVC pipe or fittings. Doing so can result in explosive failures and cause severe injury or death. **Service weight cast iron pipe shall be utilized under any/all parking and drives, concrete and gravel, and elsewhere as indicated.** Pipe size 8" and greater utilize SDR26. Refer to Division 33.
5. Sewer Force Main Piping: High-Density Polyethylene Pipe (HDPE), SDR 11, shall be produced from a high molecular weight, high density, polyethylene resin, meeting the requirements of ASTM D3350 "Standard Specification for Polyethylene (PE) Plastic Pipe and Fitting Materials." Resin material shall be listed by PPI in the name of the manufacturer and shall be based on testing in accordance with ASTM D2837 "Standard Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe." HDPE pipe shall conform to ASTM D3035 "Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter. The thickness and pressure class of HDPE pipe required for the installation and operating conditions during the expected service life of the force main shall be determined in accordance with AWWA C901-25 Polyethylene (PE) Pressure Pipe, Tubing, and Fittings, 3/4 In. (19 mm) Through 3 In. (76 mm), for Water Service". Fittings for HDPE pipe shall conform to ASTM D3261 "Standard Specification for Butt Fusion of Polyethylene (PE) Plastic Fittings for PE Plastic Pipe and Tubing," and shall be manufactured by injection molding, a combination of extrusion and machining, or fabrication from HDPE pipe material. Force mains of HDPE pipe shall be joined by the thermal butt fusion process and shall be performed in accordance with ASTM A2657 "Standard Practice for Heat Fusion Joining of Polyolefin Pipe and Fittings" and the manufacturer's recommendations during installation. All pipe used for force main construction shall be labeled or otherwise identified as conveying wastewater. Pipe shall be wrapped with 16 ga copper tracer wire. Contractors shall be fully-trained and qualified by the manufacturer to install HDPE pipe. Continuous and uniform bedding, hunching, and backfill that is appropriate for the soil type and pipe material shall be provided in the force main trench. A minimum burial depth of three feet as measured from the crown of the pipe to the ground surface shall be provided throughout the length of the force main. In the event that the appropriate installation

depth cannot be met by the design, the force main shall be constructed of ferrous pipe or provided with a ferrous pipe encasement. Force mains shall be adequately anchored to resist thrusts that may develop at bends, tees, plugs, and at any other location where a change in flow direction occurs. Such anchoring shall be provided through the use of concrete thrust blocking or restrained joint pipe. Concrete thrust blocks shall be located between the fitting to be anchored and undisturbed soil material. Appropriate thrust reaction block bearing areas shall be calculated based not only on the maximum expected force but also on the soil material. Concrete thrust blocks shall have a minimum compressive strength of 2,000 pounds per square inch. Self-restrained joints or joints restrained with tie rods and clamps shall both be acceptable. In both cases, component parts shall either be manufactured of corrosion-resistant materials or coated liberally with a corrosion-retarding product. Anchoring devices shall be designed to withstand force main pressures of at least 25 percent greater than the maximum pump shut-off head plus an allowance for water hammer and an appropriate factor of safety.

C. Specifications:

1. Pipe or Pipe Fittings:

- (a). Steel pipe, Schedule 40 or seamless steel pipe ASTM A 120.
- (b). Cast iron pipe, cast iron, pitch coated, hub and spigot soil pipe and fittings, ASTM A 74, of U.S. Manufacturer, Tyler Pipe or Charlotte.
- (c). Cast iron bell and spigot pipe conforming to requirements of ANSI Specification A21.6 or Federal Specification WW-P-421A, Type III, Class 100.
- (d). Cast iron pressure pipe conforming to requirements of ANSI A 21 and A21.8, Fed. Spec. WW-P-421, Type II or III, 150 psi minimum working pressure.
- (e). Copper tube, seamless hard drawn or soft, Type L or K, ASTM B 88. DWV shall conform to ASTM B 306.
- (f). Propress system by Viega, acceptable per copper piping system above grade. Areas installed shall not subject to the piping system to freezing.
- (g). Allowed only as indicated herein above. PVC pipe, clean, virgin ASTM D1784, Type I, Grade 1, 2000 psi design stress, unplasticized polyvinyl chloride resin, Schedule 40.
- (h). No-hub mechanical stainless steel coupling joint, above grade, in sanitary drain and vent and roof drains so as to allow proper installation in allowable space.
- (i). Ductile iron, ANSI A21.51, Grade 60-42-10, coal tar exterior, cement mortar lined per ANSI A21.4, CI 50.
- (j). RCP: Concrete pipe shall be bell and spigot or tongue and groove, Class III, ASTM C76, non-reinforced or reinforced as specified, with neoprene gasket.
- (k). Plastic Gas Pipe: Butt-Fused. Same as standard for pipe.

- (l). AWWA C-900 PVC conforming to ASTM D-1784 and D-2241; pipe and fittings.

2. Fittings:

- (a). Black and galvanized malleable iron screwed fittings, 150 lb. steam rating, ANSI Specification B16.3.
- (b). Black and galvanized cast iron screwed drainage fittings, ANSI Specification B16.12.
- (c). Wrought copper and wrought bronze solder-joint fittings, ANSI Specification B16.22.
- (d). Steel butt welding fittings - standard weight, ANSI Specification B16.9, seamless steel with wall thickness to match pipe.
- (e). Flanges for steel pipe Class 150 cast iron flanges (lap or screwed) ANSI Specification B16.1, except that when welded pipe is specified, flanges shall be forged steel welding neck flanges, Class 150 ANSI Specification B16.6.
- (f). PVC, same as pipe.
- (g). Compression couplings, ASTM C 594.
- (h). Fittings used in RCP shall be special plant fabricated "Y" with 3-ring joint. Use factory industry standard adaptor for RCP to cast iron, with nipple between RCP and adaptor.
- (i). PVC fittings and adaptor required at PVC to cast iron. Provide Fernco, Inc. or equal, factory fabricated adaptors for connecting to other materials. SDR 35.
- (j). No-hub jointing (mechanical, stainless steel).
- (k). Plastic Gas Pipe: Butt-fused utilizing the manufacturer's fusion procedure.
- (l). RCP: Concrete pipe fittings shall be manufactured to the same pipe specifications.
- (m). Ductile Iron: Push-on and mechanical joints per ANSI A21.11; amended to ANSI A21.51.

2.12 INSULATION

- A. Insulation shall include insulating materials, their applications, finish, bands, tie wire and weather protection for all piping, fittings, saddles, valves and equipment as indicated and specified herein. Methods of application and other details not specified herein shall be in accordance with the manufacturer's recommendations, for particular service and installation indicated, which shall constitute minimum standards. All insulation applied in workmanlike manner by skilled workmen regularly engaged in this type of work. All pipe insulation, with the exception of elastomeric tubing insulation used on bent tubing such as chilled water runouts, shall have flame and smoke hazard ratings as tested in accordance with standard

testing methods (NFPA 255 and UL 723). Ratings shall not exceed: Flame spread 25, smoke developed 50. The insulation Contractor shall certify in writing, prior to installation, that all products to be used will meet above criteria.

- B. NOTE: **Provide additional cover of two (2) coats of UV paint and 0.02" aluminum jacket on all exterior piping insulation above finished grades or exposed to atmosphere.**
- C. Domestic Hot and Cold Water Above Grade: Domestic cold-water piping insulated with 1" thick fiberglass pipe insulation with flame safe all service jacket conforming to HH-I-558A, Form D, Type 111, or equal. Domestic hot water same. Insulation not required on cold water risers in vertical chases directly behind fixtures. The jacket shall be sealed utilizing approved flap and adhesive. Seams and butt joints shall be painted and sealed with sealant coating and adhesive. No fishmouths. Fittings built up full thickness of adjacent covering with one (1) coat cement and covered with 4 oz. canvas pasted in place; wrapped and tapped fittings not allowed. Small fittings, less than 4", insulated with approved insulating cement, equal in thickness to adjacent pipe covering. Larger fittings insulated with premolded fiberglass fitting covers or mitered from section of pipe covering. All fittings are to be finished with a suitable approved mastic. Approved pre-formed factory PVC covering shall be acceptable at fittings.
- D. Condensate Drain Lines: Condensate drain lines above grade shall be covered with 1" thick flexible foamed plastic tubing with butt or longitudinal joints secured with approved adhesive.
- E. At wall hydrants mounted on exterior walls, insulate all pipe within wall with 1" flexible foamed plastic tubing with butt or longitudinal joints secured with approved adhesive.
- F. Fixtures for use by the **physically handicapped** shall have the hot water supply and drain, including the trap, insulated where exposed, utilizing factory fabricated assembly of foamed tubing and PVC covering designed specifically for ADA application. Also, cold water supply at lavatories.
- G. Horizontal Soil and Waste Piping: Horizontal soil and waste piping above finished ceiling, serving electric water coolers and floor drains that serve air conditioning equipment shall be insulated same as described above for cold water, except 1" thickness. Note: Sanitary drain lines which receive cooling system condensate shall be insulated a minimum of 15 ft. downstream from point of connection.

2.13 THRUST BLOCKS AND ANCHORS

- A. See Geotechnical Report for soil analysis. For all water lines, at 1/8 bends or greater, and at tees, caps, plugs, and other fittings, concrete thrust blocks or anchor rods shall be provided by the Contractor to firmly secure these fittings. Anchor blocks and straps shall be used under valves and hydrants on cement and plastic pipe in accordance with the manufacturer's standards or recommendation. Thrust blocks shall be of such size and dimensions as detailed on the manufacturer's installation manual. Concrete for thrust blocks shall be not leaner than 1 cement to 2-1/2 sand to 5 aggregate and having a compressive strength of not less than 2000 psi at 28 days. See Soil Investigation Report for sizing data. Otherwise, concrete shall be in strict conformance with the applicable section on concrete in these specifications. **See Soils Investigation** and submit detail sizes for blocking. **Contractor shall photograph each and identify on plan as to location prior to covering.**

2.14 TRACERS FOR NON-METALLIC PIPE

- A. A plastic bond metallized detectable foil core 2" tape shall be laid 1 ft. below surface over the non-metallic pipe. The tape is to have on it, and placed on top, "Buried Below" (with identification; Water, Drain, Sewer, Sewer Force Main, Natural Gas, etc.). The tape shall be capable of being located under 3 ft. of soil by induction pipe locators. Terra tape 2" D, or Sigma Pro-Line markings tape 2".

- B. Service pipe shall have the same tape laid 6" above the top of the service pipe and project 1 ft. into or alongside each meter box.

2.15 PIPE SEALS - FLOOR AND WALL PENETRATIONS

- A. **Penetrations by piping shall be sealed with a sleeve manufactured** from non-metallic, non-corrosive, thermo-plastic material formed to have a water stop and anchor plate at least 4" larger than the main outside diameter and positioned in middle of sleeve body. Caps with nailing flanges shall be provided on each end. Thunderline, Link-Seal, or approved equal.

2.16 DIELECTRIC ISOLATORS

- A. Provide non-conducting dielectric connections wherever jointing dissimilar metals install approved factory fabricated isolator on piping systems. Epco type GX or FX, Maloney Type E, or Capital Type CS or F.
- B. Dielectric pipe fittings shall meet all requirements for tensile strength of the pipe fittings as listed in the Federal Specifications, Specification and Codes for the Plumbing Industry and ASME Engineering Specifications.
- C. Unions shall be rated at not less than 250 psi. Fittings shall meet the Standards of ASA No. B16.8 ASME.
- D. All plating shall comply with the Federal Specification.
- E. The design of the union shall eliminate any flow restriction. The gasket shall be specifically designed for the project application.
- F. The installation of the union shall allow for expansion and contraction.
- G. Provide a Certificate that certifies that the dielectric union has been tested by an independent testing laboratory and meets WW-U-516B, ANSI-B-16.39, ANSI B2-1, and Class 1 ANSI-B1-2.
- H. Submit unions for approval.
- I. Provide isolating fitting in gas piping at each building entry, except where exterior gas main or branch is plastic.

2.17 DOMESTIC WATER HEATERS - ELECTRIC

- A Contractor shall provide completely automatic electric water heaters as indicated. Heaters shall be designed to meet ANSI, NAECAM ASHRAE 90, and BOCA Codes.
 - 1. Electric heater shall be equal to standard State or A.O. Smith, or Hubbell automatic storage type. Heater tank shall have a full 5-year standard warranty and shall be UL approved. Unit shall include ON-OFF switch, direct immersion heating element of nickel chromium embedded in magnesium oxide and sealed in tinned-copper tubing. Insulation shall be a minimum of 2" thick and shall be wrapped completely around the tank. Unit shall also include automatic temperature control thermostat, approved temperature and pressure relief valve, electric junction box, over-temperature protector, alkaline borosilicate glass lined tank and certified at 300 psi water pressure and 150 psi working pressure and a chemically pure magnesium anode rod. Note: ½" thick seamless hydrastone concrete lining is acceptable substitute for glass lining with anodes. Heater shall be provided with approved ASME pressure and temperature relief valves and shall be installed in accordance with applicable Local, State and National Codes. Provide auxiliary drain pan and relief valve drain,

on 6" thick reinforced (6x6x6 w.w.f.) concrete housekeeping pad, extended 6" beyond unit footprint. Provide electrical as scheduled, see Plans.

- B. All heaters shall be provided with approved pressure and temperature relief valves and shall be installed in accordance with applicable current Local, State and National Codes and ASHRAE 90.1. Provide relief valve drains as indicated.

2.18 THERMOSTATIC MIXING VALVES – FIXTURE POINT OF USE

- A. General: Provide point-of-use mixing valves at each hot water fixture, sized and installed, in accord with manufacturer's instructions and in compliance with applicable codes. Equal to Leonard 170, 270, 370,-LF-BP models.
- B. At each hot water fixture, provide lead free bronze thermostatic mixing valves for point of use fixture service with lead free brass, stainless steel, and bronze, polymer internal components. Unit shall have inlet check valves, volume, and temperature valves. Rating and performance range shall be 90° to 140° F. and shall be set to deliver scheduled temperature water, and this setting shall be locked once established. Valve shall be sized based on the number and type of fixtures that it serves, and it shall be selected for operation at its mid-range. Exact sizing procedure and calculations shall be forwarded with the shop drawings. Pressure drop through the valve at design flow shall be indicated. Minimum flow shall be 0.25 gpm. Valve shall have cold water bypass for two handle manual faucets. ASSE 1017, ASEE 1070, NSF 61 certified. Locate at an appropriate out of the way height above finish floor, below lavatory, inside fixture enclosure, millwork, etc.
- C. **Valves shall fail in the cold open position, with modifications to above assemblies as required.**

2.19 THERMOSTATIC MIXING VALVES - SYSTEM

- A. General: Provide mixing valves as indicated, in accord with manufacturer's instructions and in compliance with applicable codes. Leonard, or equal.
- B. As indicated, provide thermostatic mixing valves for group fixture service. Unit shall have union inlet check stops, volume, and shutoff control valves, thermometer pipe kit and shall be chrome plated. Rating and performance range shall be 85°F to 140°F. and shall be set to deliver scheduled temperature water, and this setting shall be locked once established. (Valve shall be sized based on the number and type of fixtures that it serves and it shall be selected for operation at its mid-range. Exact sizing procedure and calculations shall be forwarded with the shop drawings. Pressure drop through the valve at design flow shall be indicated.)
- C. Each mixing valve shall be equipped with a safety alarm providing both auditory and visual signals of valve failure (water temperature exceeds set point for delivery). Unit shall consist of low voltage thermostat with six (6) foot capillary and adjustable temperature range, immersion well, stainless steel alarm module with alarm memory, buzzer, red alarm light, green power light, and shall fit in a standard 4" x 4" electrical box and be powered by a 40 VA 115/24 VAC transformer. Locate as directed at an appropriate height above finish floor of 5'-6".
- D. Assembly shall be exposed "rough brass" assembly as scheduled. Thermostatic water mixing valve with dura-trol solid bimetal thermostat directly linked to valve porting, adjustable limit stop, color coded scale: wall support, inlet union angle strainer, checkstops, outlet volume control/shut-off, pressure regulating valve with pressure gauges. Also, small thermostatic water mixing valve with same trim. Inlet piping manifold with unions, factory assembled and mounted on wall. Valve setting shall be tagged and clearly identified per Section 200511.
- E. Valves shall fail in the cold open position, with modifications to the above assemblies as required.

- F. Valves shall be adjusted to flows shown. Balancing shall include checking water flow under variable conditioning.
- G. Provide thermometer at discharge of mixing valve, and at return line prior to tank.

2.20 DOMESTIC WATER THERMAL EXPANSION TANK

- A. Furnish and install, as shown on the plans, Precharged steel Thermal Expansion Tank with a fixed butyl rubber bladder. The tank shall have a top NPT stainless system connection and a .301" -32 charging valve connection (standard tire valve) to facilitate the on-site charging of the tank to meet system requirements. 150 psi working pressure. Unit shall be FDA/NSF approved. Watts PLT series is equal.
- B. Thermal expansion tank to limit the pressure of the water being heated to no more than 80 pounds per square inch as required per the International Plumbing Code (current adopted edition).

2.21 EXPANSION JOINTS, RESTRAINTS AND GUIDES

- A. Provide where shown and as required by job condition, expansion joints, restraints or compensators for copper domestic hot water piping systems. Furnish, where shown on the plans, controlled flexing expansion joints or expansion compensators, pipe expansion guides and piping anchors, as required for copper pipe expansion. Pipe alignment guides shall be furnished in accordance with the manufacturer's published recommendations. See specifications sections 220420 (PLUMBING) for information regarding expansion joint types and guides, and equal manufacturer and model numbers. Expansion Joint Equipment for both sections shall be from same manufacturer for single source responsibility for piping systems expansion equipment. Submittal data shall include a tabulation of pipe guides and manufacturer's recommendations.
- B. Flexible loops shall consist of two flexible sections of hose and braid, two 90° elbows, and a 180° return assembled in such a way that the piping does not change direction, but maintains its course along a single axis. Flexible loops shall have a factory supplied, center support nut located at the bottom of the 180° return, and a drain/air release plug. Flexible loops shall impart no thrust loads to system support anchors or building structure. Loops shall be installed in a neutral, pre-compressed or pre-extended condition as required for the application. Materials of construction and end fitting type shall be consistent with pipe material and equipment/pipe connection fittings. Flexible expansion loops to be "Metraloop" as manufactured by The Metraflex Company. Equals are Metraflex "V-Loop" and Unisource "UNI Loop V-SF21".
- C. Pipe Alignment Guide (Spider Type), Pre-insulated. Primary and intermediate pre-insulated guides shall be of the radial spider type employing a heavy wall-guide cylinder with weld down or bolt down anchor base. A two section pre-insulated guide spider, which slides through the guide cylinder I.D., has a 1/8" maximum diametrical clearance with guide cylinder inside diameter and is heavy-duty band clamped tight to the carrier pipe calcium silicate insulation insert. Guide cylinder shall be of sufficient size to clear pipe and insulation and long enough to prevent over-travel of the spider. Foil-vapor barrier backed guide insulation thickness shall match pipe service insulation thickness as specified in previous pipe insulation paragraph, herein. Regarding pipe installation, the base is to be set to elevation and welded or bolted to a supporting structure. With the upper half removed, the pipe/tube with spider is set into the pre-insulated base and completely encased. The upper half of two-piece guide cylinder is then bolted into place to complete the guide. Pipe alignment guides shall be style "PG-PRE" as manufactured by The Metraflex Company, or equal by Unisource model "series PG", preinsulated.

- D. Cast steel segmented spider designed pipe alignment guides shall be installed to assure axial movement and alignment. The spider of the guide shall provide clearance for complete insulation through the guide.

2.22 BACKFLOW PREVENTERS – DOMESTIC WATER LEAD FREE

- A. Domestic - Contractor shall provide all professional services, plant, labor, equipment, and materials necessary to install a full line size and flow backflow preventer, in the domestic water supply line. Contractor shall provide a NSF lead free reduced pressure principal backflow preventer assembly equal to a Watts Series LF009 or Wilkins Series and this shall meet specifications of A.S.S.E. Standard 1013, AWWA C511, NSF, USC, UL and must be accepted by the U. S. Public Health Service. Backflow preventer shall include FDA epoxy coated strainer, test cocks and gate valves, and assembly shall consist of union connections, stainless steel internal parts, gate valves and test cocks, bronze. Installation shall be in accordance with requirements of the AWWA Standards and shall be approved by the Authority providing the water prior to purchase. It shall also be observed by the Authority and Architect prior to backfill. See Plans for additional notes.
- B. Provide factory fabricated air gap funnel device as required by Code at the relief drain. Route copper drain line (1 size larger than outlet) from funnel to nearest drain with 2" air gap.
- C. Provide 6" thick reinforced conc. housekeeping pad with turned down edges, ½" edge nosing, with 6x6x6 W.W.F. under BFP enclosure. Pad shall extend min. 6" beyond each side of housing. Mount top of pad 2" above finished grade.
- D. The completed assemblies shall be tested for compliance by a State of Louisiana certified inspector/approved installer. Indoor units shall be located at max. height of 60" a.f.f. to allow for Code access.

2.23 BACKFLOW PREVENTER ASSEMBLY OUTDOOR ENCLOSURE – PRE-ENGINEERED

- A. Factory manufactured and pre-engineered fiberglass backflow preventer assembly enclosure must meet ASSE 1060-Performance Requirements for Outdoor Enclosures for Backflow Prevention assemblies. Unit shall be equal to that manufactured by "Hot Box", "Saf-T-Cover", or approved equal.
- B. Fiberglass enclosure shall be of the Flip-Top, Heated, Insulated type and shall be designed to fit over the Backflow preventer assembly selected for installation. Enclosures shall be lockable. Drain ports are sized for full port backflow discharge and are designed for a one-way operation allowing backflow discharge but not allowing wind, debris and small animals to enter the enclosure. Standard enclosures shall be designed to support a minimum vertical load of 100lb/sf. Standard enclosures shall be designed to support wind speeds up to 120mph. Standard enclosures are ASSE 1060 certified.
- C. Construction: Fiberglass is minimum of 1/8" thick Thixotropic polyester resin reinforced with fiberglass strand. A smooth yacht quality finish, protected with UV inhibited isophthalic polyester gel coat. Non molded products will utilize an Industrial exterior texture. No wood or particle board to be used in the construction. Insulation shall be 1"-1.5" unicellular, non-wicking, polyisocyanurate foam frothed or sprayed in place.
- D. Insulation: The Insulation shall have the following properties: R-Value 8; Dimensional Stability less than 2% linear change; Compressive Strength 51psi; Flame point 325 degrees; Water absorption .037psf; Porosity 91%.

- E. Heater: ASSE 1060 Class I-Required. Heating equipment shall protect the piping and equipment from exterior temperatures to -30°F. ETL listed thermostatically controlled wall mounted air forced heaters or UL listed self-regulating cable(s) shall be furnished and designed by the enclosure manufacturer to maintain the equipment at +40F and be mounted to the supplied heater plates and/or a minimum 8" above the slab unless it is UL or ETL certified, and NEC approved for submersion. The power source shall be protected with a GFI receptacle, U.L. 943, NEMA 3R. Mounted a minimum of 8" from the bottom of the receptacle to the top of the slab. Separate 20-amp circuits (wall mounted) and 15-amp circuits (self-regulating cables) are recommended, so in the event a circuit fails all other circuits will remain powered. Installations must be in accordance with the local and national codes. The heaters shall be UL or ETL listed for wet/damp locations.
- F. At above-ground backflow preventer assembly location, securely mount enclosure on top of new 4" thick turn-down edge concrete pad, reinforced with 6x6x6 w.w.f., that shall extend min. 9" beyond each side of enclosure dimensions. Top of pad 2" above grade.

2.24 PLUMBING FIXTURE SCHEDULE

- A. Contractor shall furnish, install and connect with all required working trim, a plumbing fixture at each location indicated. Fixtures shall be standard products of approved manufacturers and shall be equal, in the Architect's opinion, to those specified by manufacturer's name and number in quality, material, appearance, and operation. Each unit shall be new and free from mars and chips, with adequate and sufficient supports in order to securely hang the fixture. Each unit shall be furnished with chromium plated brass trim in each case. All mounting accessories and each piece of trim shall be furnished whether specifically mentioned or not in order to securely fit the fixtures involved and the particular roughing-in available. Roughing-in for fixtures shall be in accordance with approved fixtures. All faucet traps and supplies to be of the same manufacturer as the fixture upon which it is installed, except as specified. **All wall-mounted fixtures shall have wall carriers as specified below.**
- B. **Caulk around the perimeter of all water closets, urinals, lavatories, water coolers, sinks, service sinks, mop sinks, and shower/tubs, etc.**
- C. **Wall- mounted fixtures shall have carriers as specified below.**
- D. Contractor shall also provide services, accessories, and make connections to equipment provided by others.
- E. Supplies shall be chrome plated brass flexible tubing provided with stops. Provide at each fixture and at equipment provided by others.
- F. Flush valves shall be fitted with sweat adapter kit.
- G. Except as noted, catalog numbers shown here are Kohler or American Standard. All trim for a complete working fixture shall be provided.
- H. Provide domestic water, drain and vent services as required for each piece of equipment. Equipment shall be provided with individual shut-off valves at water.

F-1 Public/Staff Water Closet (Flush Valve – Handicapped/ ADA): Floor mounted vitreous china siphon jet elongated bowl, Kohler K-96057-0 "Highcliff" or American Standard 3043.001, 18" high, with Bemis 1955CT or Church 295CT open front heavy duty solid plastic white seat with stainless steel check hinge and Sloan Regal 111-1.6 or Delaney U402-1.6-T5 diaphragm type flush valve with sweat solder connection; ADA compliant handle. Anchoring

bolts shall be secured firmly to floor. Provide trap primer from flush valve, where indicated on plans.

F-2 Wall-Hung Lavatory (Handicapped/ ADA): Kohler K-2030 or American Standard 0356.028, 20" x 18", wall hung vitreous china lavatory, with Josam 17100 or Wade 520 concealed arm carrier, self-draining deck & splash shields, drilling for 8" center set 3-hole drilling for Kohler K-800T70-5AKL gooseneck 1.0 gpm faucet with color-coded 4" wrist blades, 1.0 gpm, self-cleaning aerator with K-7131-A offset grid drain, and modified to have 4" wrist control handle, vandal proof /keyed Kohler K-7608 3/8" angle supplies with ½" wheel handle stops and 1-1/4" and Kohler K-8998-CP 1-1/4" adjustable chrome plated cast brass "P" trap and chrome plated brass tailpiece and waste, or approved equal. Mounting height 33" from rim to floor. Elkay K-7131-A ADA offset drain and basket strainer. Provide insulation, factory fabricated for tailpiece, trap, cold and hot water, in "knee" area; Truebro Model 103 E-Z or Plumberex PRO_EXTREME ADA Under-Lavatory Protector Model # X4444. Installation shall meet ADA requirements, or approved equal. Provide approved manufacturer trap primer pipe connection at drain above trap where indicated on plans. Provide Leonard point of use mixing valve below lavatory, Leonard 270-LF1/2"-B-P, set at 105°F.

F-3 Single Compartment Handwash Sink (ADA): Elkay Celebrity/ Pacemaker PSR1716, self-rimmed 17"w x 16"l x 7.25" deep bowl, Type 304 series stainless steel "hospitality-type" countertop sink, single compartment, 20-gauge with ledge back and drilling for T&S B-2862; 8-13/16" reach faucet, 4" wristblade handles, or American Standard 6540.177 with widespread wrist handles. Ceramic disc with check valves. Faucet- 0.50gpm high gooseneck spout and multi-laminar spray, vandal proof 3/8" angle supplies with ½" wheel handle stops, stainless grid drain and 1-1/4" adjustable chrome plated cast brass "P" trap or approved equal. Elkay LK35 or Just J35 basket strainer. Provide approved manufacturer trap primer pipe connection at drain above trap, where indicated on plans. Provide thermostatic mixing valve below sink, Leonard 270-LF1/2"-B-P, set at 105°F.

F-4 Neo-Corner Mop Sink: Fiat TSBC 6011 Stockton Neo-corner Mop basin, 32"x32"x12", 10" deep service basin with 3" drain outlet and strainer, Fiat 830-AA faucet with vacuum breaker, wall brace, pail hook and integral stops, 832-AA 30" flexible hose and bracket, 899-CC mop hanger, 1239BB bumper guard, and 833AA silicone sealant. MSG S.S. Duraguard wall guards. Installed per manufacturer's installation instructions or approved equal. Leonard 370 – LF ¾" – BP mixing valve at 110F.

F-5 EWC Bottle Filling Station – Bi-Level ADA Water Cooler (ADA): Elkay Model LZSTL8WSLK. Wall-hung bottle filling station and versatile water cooler. ezH2O Bottle Filling Station & Bi-Level ADA Cooler Filtered, Light Grey Granite painted Steel. Chilling capacity of 8.0 gph of 50°F drinking water, based on 80°F inlet water and 90°F ambient. Features shall include Antimicrobial, Filtered, Green Counter, Laminar Flow, Real Drain, Visual Filter Monitor, Lower Shroud. Furnished with Flexi-Guard Bubbler, Electronic Bottle Filler with Sensor & electronic front and side Bubbler push-bar activation. For indoor use. Product shall be Wall Mount. Unit shall be lead-free design which is certified to NSF/ANSI 61 & 372 (lead-free) and meet Federal and State low-lead requirements. UL 399, CAN/CSA C22.2 No. 120 certified. Josam 17560-WCBL wall chair carrier or Smith 800 series or approved equal. Provide second spare 3,000-gallon min. filter to owner. Contractor shall figure in Bid to provide and install gray Cane Apron (Elkay model "EZ" or approved equal.) as required.

F-6 Refrigerator Freezer Connection: Cold water service with valve and water hammer arrestor in stainless steel box. Route ½" water line to appliance. Guy Gray 88527 with lead free, quarter turn sweat valve. Box at 24" A.F.F.

2.25 EQUIPMENT

- A. Contractor shall provide services to and make final connections at all equipment, provided and set in place by others, and those furnished by Owner as indicated on the Architectural Plans. Work consists of providing all services with roughing-in as required by equipment supplier=s shop drawings, including necessary pipes, valves, strainers, traps, ventilation, controls, hot

water, cold water.

2.26 PACKAGE DUPLEX SEWER GRINDER LIFT STATION - DUPLEX GUIDE RAIL PUMPS

A. General Description

1. The Contractor shall furnish and install all sanitary sewer gravity and force main lines, duplex grinder pump stations, etc.

B. Project Conditions and Requirements

1. The contractor shall visit the site and familiarize himself with the difficulties which may be encountered in execution of the work. He shall perform his work to meet existing conditions as found at the site and shall accommodate the work of other trades.
2. Before any excavation is done, the contractor shall call "Louisiana One Call" at 1-800-272-3020 and all local utility companies that may have utilities on the project vicinity so as to have all underground utilities located. All excavation is to be coordinated with the, Grant Parish Permit Office/ OPH Sanitarian/ Public Health Inspector/ Rapides Parish Planning Commission, Grant Parish School Board, Principal of Verda Elementary School, and no excavation shall be performed without their approval.

C. Grinder Lift Pump Station

1. Furnish and install one (1) duplex grinder lift pumping system as described in these specifications and on the Plans. Each system shall include the following.
 - a) (1) sump basin
 - b) (1) sump cover
 - c) (2) sewage grinder pumps
 - d) (2) guiderail assembly
 - e) (2) pump bracket assembly
 - f) (2) lifting cable assembly
 - g) (2) discharge header
 - h) (2) gate valve extension handle
 - i) (1) inlet pipe connection
 - j) (1) electrical junction box
 - k) (1) pump control panel
2. **Basis of Design: Factory Assembled Station by Liberty Pump D3600-Series, "D36120LSG202-24" with 2 Liberty LSG Omnivore duplex grinder pumps and unit mounted "AE24H=4" duplex alternating control panel.**
3. Barnes/Crane Pumping Systems is an additional acceptable manufacturer; however, the final package duplex sewer grinder lift station submitted and provided by the Contractor shall strictly meet the requirements of the Project Specifications herein, and the Project Drawings.

D. Fiberglass Sump Basin

1. *Resin*: The resins used shall be a commercial grade unsaturated polyester resin (isophthalic). Basins/wet wells utilizing orthophthalic resin shall not be considered acceptable.
2. *Reinforcing Materials*: The reinforcing materials shall be commercial grade "E" type glass in the form of mat, chopped roving, roving fabric, or both, having a coupling agent that will provide a suitable bond between the glass reinforcement and the resin.
3. *Fillers and Additives*: Fillers of any type shall not be utilized. Additives, such as thixotropic agents, catalysts, promoters, etc., may be added as required by the specific

manufacturing process to be used to meet the requirements of this specification. The resulting reinforced-plastic material must meet the requirement of this specification.

4. *Exterior Surface*: The exterior surface shall be relatively smooth with no sharp projections. Hand-work finish shall be utilized to insure that enough resin is present to eliminate exposed fibers. The exterior surface shall be free of delamination, exposed fibers and blisters larger than 0.5" in diameter.

5. *Interior Surface*: The interior surface shall be resin rich with no exposed fibers. The surface shall be free of crazing, delamination, blisters larger than 0.5" in diameter, and wrinkles of 0.125 in or greater in depth.

6. *Dimensions*: The dimensions shall be 36" x 120" as shown on the drawings.

7. *Wall Stiffness*: The basin/wet well shall have a pipe stiffness as shown below (per 1984 ASTM standard No. D3753, Table 1):

BASIN/WETWELL DEPTH (in X ft)	PIPE STIFFNESS
3-6	.72
6.5-12.1	1.26
12.5-20.1	2.01

8. *Material Properties*: The following properties shall be established for each type of construction used in the basin/wet well.

9. *Material Composition*: The wall and bottom laminates shall have a glass content of 25% $\pm$ 5%.

10. *Flexural Strength and Modulus*: The flexural strength and modulus of the basin/wet well wall in the hoop and axial directions shall be a minimum of 800,000 PSI.

11. *Hardness*: The minimum barcol hardness shall not be less than 90% of the resin manufacturer's minimum value for the cured resin.

12. *Thickness*: The basin/wet well wall thickness shall be adequate to maintain structural integrity when installed in the following conditions.

- 1) Soil modulus of 700 PSI
- 2) Soil density of 120 lbs. per cu. ft.
- 3) Luscher's safety factor of 2

13. *Sump Cover*: The 42.5" dia. sump cover shall be fabricated of green fiberglass material and shall have a minimum of 0.5" thickness on sump basin of 36" diameter. Cover bolted to basin top flange.

E. Grinder Pumps

1. *General*: Contractor shall furnish all labor, materials, equipment and incidentals required to provide (2) submersible centrifugal sewage grinder pumps as specified herein. Pumps shall operate in parallel when there is more flow into the wet well than one pump can handle.

2. *Operating Conditions*: Each pump shall be rated 2 HP, 240 volts, 1 phase, 60 hertz, 3450 RPM. The unit shall produce 40 U.S. GPM at 60' TDH.

3. *Construction*: Each pump shall be of the sealed submersible type, equal to Model LSG Omnivore, as manufactured by Liberty Pumps, Inc. The pump volute, motor and seal housing shall be high quality gray cast iron, ASTM A-48, Class 30. All external mating parts shall be machined and Buna N Rubber O-ring sealed on a beveled edge.

Gaskets shall not be acceptable. All fasteners exposed to the pumped liquids shall be 300 series stainless steel.

4. *Electrical Power Cord:* 24' Electrical power cord shall be water resistant 600V, 60° C, UL and/or CSA approved and applied dependent on amp draw for size. The pump shall be protected with compression fitting and epoxy potted area at the power cord entry to the pump. A separation between the junction box areas of the pump and the motor by a stator lead sealing gland or terminal board shall not be acceptable. The power cable entry into the cord cap assembly shall first be made with a compression fitting. Each individual lead shall be stripped down to bare wire, at staggered intervals, and each strand shall be individually separated. This area of the cord cap shall then be fitted with an epoxy compound potting which will prevent water contamination to gain entry even in the event of wicking or capillary attraction. The power cord leads shall then be connected to the motor leads with extra heavy connectors having brass inserts with a screwed wire to wire connection.
5. *Motor:* The stator, rotor and bearings shall be mounted in a sealed submersible type housing. The stator windings shall have Class F insulation, (155°C. or 311°F.), and a dielectric oil filled motor, NEMA B design (3 phase), NEMA L design (single phase). The pump and motor shall be specifically designed so that they may be operated partially dry or completely submerged in the liquid being pumped. Stators shall be securely held in place with a removable end ring and threaded fasteners so they may be easily removed in the field, and must be capable of being repaired or rewound by a local motor service station. No special tools shall be required for pump and motor disassembly. Pump shall be equipped with heat sensors. The heat sensor(s) (one on single phase, two on three phase) shall be a low resistance, bi- metal disc that is temperature sensitive. It (they) shall be mounted directly in the stator and sized to open at 120°C or 130°C and automatically reset at 30–35°C differential. The sensor shall be connected in series with the motor starter coil so that the starter is tripped if a heat sensor opens. The motor starter shall be equipped with overload heaters so all normal overloads are protected by external heater block.
6. *Bearings and Shaft:* An upper radial bearing and a lower thrust bearing shall be required. These shall be permanently lubricated by the dielectric oil which fills the motor housing. The shaft shall be machined from a solid 416 stainless steel and be a design which is of large diameter with minimum overhand to reduce shaft deflection and prolong bearing life.
7. *Seals:* The rotor and stator in the motor housing shall be separated and protected from the pumped liquid by an oil filled seal housing incorporating two type 21 carbon ceramic mechanical seals mounted in tandem. This seal housing shall be equipped with 2 moisture sensing probes installed between the seals, and the sensing of moisture in the seal chamber shall be automatic, continuous, and not require the pump be stopped or removed from the wet well.
8. *Impeller:* Impeller shall be brass multi-vane, semi-open, non-overloading design. They can either be factory or field trimmed to meet specific performance conditions. Impellers shall be hydraulically and statically balanced at the factory, and machined for threading on to the pump shaft. Wear or field trimming shall not deter the factory balance.
9. *Grinder Cutters:* The combination centrifugal pump impeller and grinder unit shall be attached to the common motor and pump shaft made of 416 stainless steel. The grinder unit shall be on the suction side of the pump impeller and discharge directly into the impeller inlet leaving no exposed shaft to permit packing of ground solids. The grinder shall consist of two stages. The cutting action of the second stage shall be perpendicular to the plane of the first cut for better control of the particle size. The grinder shall be capable of grinding all materials found in normal domestic sewage, including plastics, rubber, sanitary napkins, disposable diapers, and wooden articles

into a finely ground slurry with particle dimensions no greater than 1/4 inch. Both stationary and rotating cutters shall be made of 440C stainless steel hardened to Rockwell 60C and **ground to close tolerance. The upper (axial) cutter and stationary cutter ring shall be reversible to provide new cutting edges to double life. The stationary cutter ring shall be a slip fit into the suction opening of the volute and held in place by three (3) 300 series stainless steel screws and a retaining ring.** The lower (radial) cutter shall macerate the solids against the I.D. of the cutter ring and extrude them through the slots of the cutter ring. The upper (axial) cutter shall cut off the extrusions, as they emerge from the slots of the cutter ring to eliminate any roping effect which may occur in single stage cutting action. The upper (axial) cutter shall fit over the hub of the impeller and the lower (radial) cutter shall be slip fit and secured by means of peg and hole and rotate simultaneously with the rotation of the shaft and impeller. The grinding mechanism shall be locked to the shaft by a 300 series stainless steel countersunk washer in conjunction with a 300 series stainless steel flat head cap screw threaded into the end of the shaft.

10. *Painting:* The pump shall be painted after assembly, and testing, with a dark maroon water reducible air dry enamel. The paint shall be applied in one coat covering all exterior surfaces.

11. *Testing:* Commercial testing shall be required and include the following:

- a. The pump shall be visually inspected to confirm that it is built in accordance with the specification as to HP, voltage, phase and hertz.
- b. The motor and seal housing chambers shall be hi-potted to test for moisture content and/or insulation defects.
- c. Pump shall be allowed to run dry to check for proper rotation.
- d. Discharge piping shall be attached, the pump submerged in water and amp readings shall be taken in each leg to check for an imbalanced stator winding. If there is a significant difference in readings, the stator windings shall be checked with a bridge to determine if an unbalanced resistance exists. If so, the stator will be replaced.

12. *Warranty:* The pump station unit or any part thereof shall be warranted against defects in material or workmanship within 3 years from date of installation, and shall be replaced at no charge with a new or remanufactured part, FOB factory or authorized warranty service station. The warranty shall not assume responsibility for removal, reinstallation or freight, nor shall it assume responsibility of incidental damages resulting from the failure of the pump to perform. The warranty shall not apply to damage resulting from accident, alteration, design, misuse or abuse.

13. *Guiderail Assembly:* The Liberty Pump "GR20" guiderail assembly shall be constructed of galvanized steel and shall consist of a minimum of two rails per pump, a bottom base plate, a minimum of one cross brace every 18 inches between the rails and a wall brace all welded together to provide the maximum structural integrity. The rails shall be round to provide a non-binding surface during installation and removal of the pump. The guide rail assembly shall be installed as a one piece unit and shall be bolted to the basin wall a minimum of two places each. Guide rail assemblies of more than one piece construction and/or which is attached to the basin cover shall not be considered acceptable.

14. *Pump Bracket Assembly:* The pump bracket assembly shall consist of a top bracket and a bottom bracket. The brackets shall be fabricated of 1/4" steel material and painted with coal tar epoxy paint to provide a coating which shall have a minimum of 10 mil thickness. The top bracket shall be attached to the discharge piping above the pump disconnect and shall be constructed in such a manner that the pump cannot be

removed from the guiderail assembly except when removing pump out the top of the pump basin. The bottom bracket shall be attached to the pump at the discharge connection and shall guide the pump along the guiderail assembly to insure proper alignment of the pump. Under no circumstances shall any part of pump bracket assembly or guiderail assembly be bolted to the bottom of the pump.

15. *Lifting Cable Assembly:* A 3/16" (7x19) x 6'-0" stainless steel lifting cable shall be furnished for lifting and lowering the pump in the sump basin. The stainless steel lifting cable shall be of the 18-8 type 302/304 stainless steel and shall have minimum nominal breaking strength of 15 times the weight of the pump. It shall be substantially attached to the top of the assembly and shall have a formed loop at the other end.
16. *Discharge Header:* The 2" discharge piping shall be Schedule 80 PVC and include ball check valve, unions, shutoffs, with a natural rubber ball and clean out port with plug for easy access, a brass quick disconnect fitting, with an o-ring seal and a non-rising stem stainless steel gate valve, per pump. All Other piping shall be stainless steel and shall terminate at a single coupling on the exterior of the basin wall. The discharge point of the pump station shall be located 2' below the station cover to provide adequate frost protection of the discharge line.
17. *Gate Valve Extension Handle:* All stations shall have a gate valve extension handle per gate valve which will allow the gate valve to be operated from a maximum of 6" below the basin cover. The handle shall be constructed of a minimum of 3/8" dia. Type 304 stainless steel. The handle shall be held in place by being attached to the gate valve and by the guide rail wall brace.
18. *Inlet Hub and Vent:* A bolt-on, cast iron caulking type hub sized to receive an "inlet" pipe shall be furnished. Location and installation of hub shall be by contractor. A PVC vent connection in sump basin and PVC vent piping shall be furnished with unit. Installation of vent piping shall be by contractor.
19. *Painting:* All metal parts that are not PVC, brass, galvanized steel, or stainless steel shall be painted with coal-tar epoxy paint to resist corrosion, unless otherwise noted.

F. Motor Control System

1. General: The electrical controls shall be contained in a common enclosure. A circuit breaker shall be provided for each motor and a magnetic motor starter with 3 leg (for 3 phase motors) or 2 leg (for single phase motors) overload protection shall be supplied for each motor. An alternating relay shall be provided to change the lead pump after each cycle. The controls shall be designed so both pumps will operate in parallel if there is more flow into the wetwell than one pump can handle. A hand-off-auto switch and green run light shall be provided for each motor. Terminals shall be provided for connection of wiring from motors, level sensors, etc. A high wetwell level alarm shall be provided and shall be mounted on the control enclosure.
2. *NEMA 4X Enclosure:* Duplex pump controls enclosure shall be NEMA 4X panel for outdoor use and be suitably sized to house all components within the enclosure, Liberty Pump "AE24H=4". Heavy duty wide clamping securable latches (2) and 1/4 turn set screw type closure mechanisms of sufficient quantity for the enclosure size shall be required to assure a positive seal. A locking hasp shall be supplied. Integral mounting flanges. Enclosure shall be made from heavy duty grey ultraviolet stabilized thermoplastic for outdoor use, with gasketed closure seal. Enclosures and panels shall be furnished with equipment following. Box shall be gray on the exterior and white on the interior. Panel shall be white. A drip shield with gray finish to match the box shall be attached to the top of the enclosure. Enclosure shall be mounted on a panel stand at the pump station as shown on the drawings. Enclosure shall house at minimum: HOA switch for manual operation of pumps (on circuit board), magnetic motor contactors control pumps by switching electrical lines, circuit breakers to

provide pump disconnect and branch circuit operation, ground lugs, alarm beacon and horn, pump-run indicator lights, auxiliary contacts, four (4) float switches, float switch terminal block, float switch status indicators, exterior alarm test/normal/silence switch.

3. *High Wetwell Level Alarm:* The station shall be provided with a suitable alarm beacon and horn device to provide audio/visual warning of alarm condition, activated by a separate level control. This alarm shall signal a high water condition in the sump by a flashing red alarm light mounted on the outside of the control panel.
4. *Sump Level Controls:* Four (4) Sealed float type mercury-free switches shall be supplied to control sump level and alarm signal. 20 foot 18 ga, 2 conductor flexible cord min, or as required by specific model. Provide any external weights or pipe clamp mounts required. The float switches shall be sealed in a solid polypropylene float for corrosion and shock resistance. The support wire shall have heavy neoprene jacket and a weight shall be attached to the cord above the float to hold switch in sump and to prevent sharp bends in the cord when the float operates under water. The float switches shall hang in the sump supported only by the cord. Three (3) float switches shall be used to control level. One for pump turn-on, one for pump turn-off, and one for both pumps turn-on. A fourth switch shall be provided for alarm control. Duplex controller shall be equipped with the following min.: Pump HOA switches with green/red LED indicators, Control power ON/OFF switch, Power ON green LED indicator, Float switch status red LED indicators, Foat switch push-to-test buttons, pump selector switch, auxiliary alarm contacts, terminal blocks for incoming power and float switches.
5. *Guarantee:* The manufacturer of the lift station shall furnish a parts and labor warranty for 3 years from the date of Project Acceptance that all equipment shall be free from defects in design, materials and workmanship. The lift station manufacturer shall furnish replacement parts with labor for any component proven defective, whether of his or other manufacturer during the guarantee period, excepting only those items which are normally consumed in service, such as light bulbs, oil, grease, packing, etc.
6. *Workmanship and Experience:* All workmanship and materials throughout shall be of the highest quality. The station shall be the product of a supplier who has been actively engaged in research, development and has supplied proven field installations of complete sewage pumping systems for not less than five (5) years.

PART 3 - EXECUTION

3.1 VALVES

- A. Valves placed underground shall be enclosed in cast iron commercial type valve box with appropriate marking on cover. Installation shall be in accord with requirements of Utility Company.

3.2 CLEANOUTS

- A. Same nominal size as pipes up to 4", not less than 4" for larger piping; not less than 50' apart in horizontal lines of building drain 4" or less, and not more than 50' apart for larger pipes and installed at each change of direction greater than 45°. Locate as indicated and as required by Code. Location in finished floors and walls shall be approved by Architect. Except as indicated otherwise, cleanouts in sewer lines shall consist of Y's and bends brought to grade every 75' and set in a 12" x 12" x 4" deep square of concrete with brass raised square head plug and brass ferrule at grade, with 1 cu. ft. of concrete at base of wye-el riser. Locations outside building shall be mapped and information given to Owner. Cleanouts in walls shall be covered flush with

chrome plated steel access frame and cover. Cleanouts in floors shall be brought up to level of finished floor; do not terminate in space between ceiling and floor above. **Cleanouts and covers for finished floors and walls shall be as specified herein and per Architectural Plan floor assembly; submit for approval. Note that spacing is less than that required by Code.**

3.3 PIPING

- A. Underground piping shall be arranged in a manner so as to allow application of specified insulation.
- B. Joints in copper tube shall be made by cutting tube square, removing all burrs, both inside and outside, emery cloth or steel wool cleaning both inside of fitting and outside of tube to shiny finish, heating, fluxing with good non-corrosive paste type resin flux and soldering. Any solder or flux utilized in the installation of piping systems carrying drinking water shall be lead free. Use 95% tin - 5% antimony solder above floor slab. Joints below floor slab, only allowed if approved by Architect, shall be made with silver solder.
- C. Joints in hub and spigot cast iron pipe by using positive double-seal elastomeric compression-type gaskets conforming to ASTM C 564. Lubricant used in assembly of gasket type joints shall include an adhesive. Service pipes shall be joined with service gaskets and extra heavy pipe with extra heavy gaskets. Joints between cast iron and lead pipe are to be made with heavy brass soldering nipples and ferrules. Joints between cast iron and steel are to be made with tapped fittings or tapped spigot adaptors.
- D. Joints in screwed steel pipe, thin coat of red lead and oil, or graphite and oil applied to male thread only; joint must be perfectly tight without use of fillers, or without caulking. Inside of pipe must be clean and free of burrs, fins, etc.
- E. Welded piping systems shall be made by electric arc welding method in accordance with standards of American Welding Society. Pipe shall be cut smooth and square, and all burrs removed with reamer before welding. Welding electrodes shall be of material compatible with piping material used and shall be coated and of diameter as recommended by manufacturer for type and thickness of work being done. Welding fittings in forms of tees, crosses, ells, caps, reducers, etc., shall be used on piping except that shaped nipples for both 45E and 90E may be used to tap mains when pipe size tapping main is 2 or less than 2 the pipe size of the main, and weld-o-lets may be used up to 2 pipe size of the main being tapped. Back-up rings will not be permitted. Welds shall be carefully chipped and thoroughly brushed clean after each pass. Electric current for welding shall be provided by Contractor's portable generator as hereinbefore specified under Section 200511. All welds shall be free of cracks, voids or other defects.
- F. PVC Pipe:
 - 1. Joints as specified hereinbefore. Fused joints shall be in accordance with manufacturer's recommendations. Pipe installed in true line with backfill and thrust blocks per manufacturer's installation manual and as determined in field for actual soil conditions.
 - 2. Plastic pipe shall be installed in accordance with ASTM D 2321 and the manufacturer's recommendations.

3.4 INSULATION

- A. Spacing for each piping system maintained so that it will be possible to install insulation completely around piping and fittings without reducing specified thickness of insulation. Insulation continuous through walls, ceilings, etc. Hangers for support of piping placed on outside of pipe covering and not in contact with piping. Between each hanger and the insulation, place a 14-gauge galvanized iron shield which will extend 4" on each side of hanger and up to center line of pipe insulation. Where trapeze hangers are used, provide 12-gauge shields. Piping, valves and fittings shall have been tested tight prior to insulating. Foreign matter such as

rust, scale, plaster, dirt, etc., fittings insulated with molded or fabricated insulation of thickness equal to that of insulation of adjoining pipe, securely fastened in place. Insulation to be installed in strict accordance with manufacturer's recommendations by qualified and experienced Insulation Contractor.

3.5 FLASHINGS

- A. Except for metal roofs, pipe openings through roof shall be flashed using 4 lb. sheet lead. Construct with base 6" beyond pipe or drain openings in all directions, 6" beyond perimeter of drain. Extend vertical tube flashing up pipe and turn into pipe cavity 2" with minimum blockage of free area of stack. Plumbing Contractor to fabricate lead flashing and turn over to roofer for installation at roof level. Plumbing Contractor to complete installation at uppermost point of pipe.
- B. For metal roofs, the curbs and jacks equipment, pipe penetrations, flue stacks and other roof mounted mechanical equipment shall be provided by the metal roof manufacturer in accord with specifications and details.
- C. **E.P.D.M. flashing assemblies shall be provided on metal roofs as approved by Architect.**
- D. All drains located above finished ceiling shall have an additional clamping device and lead flashing for added protection against roof leaking.
- E. **Refer to Architectural Details for metal roof penetrations.**

3.6 SERVICE

- A. Provide domestic cold water and sanitary sewer, as indicated. See Paragraph "Piping" for materials applicable to both interior and exterior pipe.
- B. Sanitary Drainage: Provide complete system of sanitary waste and vent piping as indicated, specified and comply with State of Louisiana Plumbing Code, Current Version. Horizontal lines 3" and smaller shall be sloped at not less than 1/4" per foot; 4" to 8" shall slope not less than 1/8" per foot unless otherwise indicated. Connect fixtures to vertical stacks with single, double tapped or combination sanitary tees. Use quarter bends in changes of direction from horizontal to vertical. Make junctions in horizontal lines with "Y's" and appropriate bends. Use "Y" and 1/8" bend fitting where stack drops directly into horizontal line or where cleanout is taken off bottom of riser. Provide special fittings where necessary. Vent lines shall be taken off horizontal lines above center line of pipe. Grade horizontal vent pipes to drain back into waste or vent stack.
- C. Domestic Water:
 - 1. Provide complete system as indicated. Air chambers installed as stated herein. Provide gate valves or stops at each inlet to fixture or equipment. Valve below grade installed in commercial grade cast iron valve box with top at ground level.
 - 2. Protection of Potable Water Supply:
 - (a). Separate Trenches: The horizontal distance between the underground water service pipe and the building drain or building sewer shall not be less than 6 ft., and the intervening space shall be undisturbed earth or filled with compacted earth; except as permitted in Section 14:107-2.
 - (b). Water lines crossing sewer lines shall be laid to provide a minimum vertical distance of 18 inches between the outside of the water line and the outside of the sewer line.
 - (c). One Trench: Water service pipe may be placed in the same trench with the building drain and building sewer provided the following conditions are met:

- (i). The bottom of the water service pipe must be at least 24 inches above the top of the sewer line at all points.
 - (ii). The water pipe must be placed on a solid shelf excavated at the side of the common trench.
 - (iii). The materials and joints of sewer and water service pipe shall be installed in such manner, and shall possess the necessary strength and durability, to prevent the escape of solids, liquids, and gases.
- 3. After all piping has been installed, it shall be disinfected prior to connection to existing distribution piping in accord with Local and State Health Department requirements.
 - (a). Fill system with solution of 50 ppm available chlorine and allow to stand 12 hours before flushing and placing in service.
 - (b). Contractor is hereby advised that in accord with Section 200511, Paragraph 1.8, "Codes and Permits", prior to acceptance and use of the water by consumers, sampling and testing are to be conducted by the local Health Department with results reported to the Owner, Architect and Contractor. Contractor shall notify the local Health Department, with at least a 24-hour notice, that the domestic water system is ready for testing. Installation shall be approved by the Health Department prior to any use by consumers.
- E. Minimum Ground Cover – Water, Sewer, and Sewer Force Main: **Except as noted otherwise or in Division 33** work, minimum cover shall be as follows:

Domestic Water	-	30"
Sanitary Sewer	-	36"
Sanitary Sewer Force Main-		36"

3.7 INSTALLATION OF DOMESTIC WATER HEATERS

- A. General: Install gas-fired and electric domestic water heaters as indicated, in accordance with manufacturer's installation instructions, and in compliance with **applicable Codes**.
- B. Support: Set units on 6" thick reinforced (6x6x6 w.w.f.) concrete pads extended 6" beyond heater footprint, and 16ga galvanized steel drain pan, orient so controls and devices needing service and maintenance have adequate access. Level and plumb unit.
- C. Gas Supply: Connect to gas line with drip leg, tee, gas cock, and union; full size of unit inlet connection. Locate piping so as not to interfere with service of unit.
- D. Piping: Connect hot and cold water piping to units with shutoff valves and unions. Connect recirculating water line to unit with shutoff valve, check valve, and union.
- E. Flue: Connect flue to draft hood with gas-tight connection, and per flue and water heater mfg. instructions.
- F. Start-Up: Start-up, test, and adjust gas-fired and electric water heaters in accordance with manufacturer's start-up instructions. Check and calibrate controls, adjust burner for maximum efficiency.
- G. Field Services: **Contractor shall provide the services of a local factory authorized representative to supervise all phases of equipment start-up.** A letter of compliance with all factory recommendations and installation instructions shall be submitted to the engineer with operation and maintenance instructions.

3.8 PLUMBING FIXTURES

- A. Install plumbing fixtures of types indicated where shown and at indicated heights; in accordance with fixture manufacturer's written instructions, roughing-in drawings, and with recognized industry practices. Ensure that plumbing fixtures comply with requirements and serve intended purposes. Comply with applicable requirements of the Plumbing Codes pertaining to installation of plumbing fixtures.
- B. Fasten plumbing fixtures securely to indicated supports or building structure; and ensure that fixtures are level and plumb. Secure plumbing supplies behind or within wall construction so as to be rigid, and not subject to pull or push movement.
- C. Clean plumbing fixtures of dirt and debris upon completion of installation.
- D. Protect installed fixtures from damage during the remainder of the construction period.

3.9 EQUIPMENT CONNECTIONS

- A. Contractor shall be responsible for providing services to and making final connections to all equipment in accord with approved equipment installation instructions. Provide stop valves at water and gas connections.
- B. Contractor shall provide service piping for all equipment connections. Make all final connections. Shock arrestors shall be provided for quick closing water valves. Balance entire building systems.

3.10 CLEANING

- A. All pipe systems are to be installed in a manner to exclude all foreign material from interior. Interior of pipes shall be cleaned prior to installation.
- B. After installation, lines shall be flushed out and cleaned so as to remove all dirt, scale, metal and other foreign material.
- C. Pipe strainers shall be cleaned and checked to ensure that system is clean.

3.11 ROUTING

- A. Various trades involved shall coordinate prior to commencing work so as to avoid interferences.
- B. All interferences with structural members reviewed by Architect prior to starting work.

3.12 TESTING

- A. Plumbing systems shall be tested in accordance with the current Year Edition Louisiana State Plumbing Code as a minimum, except as specified greater herein below.
- B. **Backflow preventers shall be tested as required by State of Louisiana Plumbing Code.**
- C. All equipment and piping systems shall be tested in the presence of Architect to ensure that it is performing as specified; twenty-four (24) hours prior notice required and shall not be covered or made inaccessible until approved by utility agency having jurisdiction and Architect.
- D. Test all piping systems and pressure vessels before they are covered or made unavailable for complete inspection. Each system to be insulated will be thoroughly tested before insulating.
- E. Apply test pressure to all test systems (except drainage) using hydrostatic pump. Air

removed from system prior to testing. Specialties shall not be tested at more than 1-1/2 times their service rating.

F. Test pressure shall be as follows:

1. Domestic Hot and Cold Water: Test with water at 200 psig for Two (2) hours.
2. Sanitary Drain Systems: Close all openings except the highest opening and fill to point that is level with top of highest opening, hold at this point without loss of water for a period of one (1) hour before starting inspection. Test horizontal lines with a minimum of 10' head.
3. Exterior Sanitary Drain System: Industry Standard. See Division 22.
4. Water Heaters: 1-1/2 times the maximum working pressure. Check and demonstrate to Owner operation and safety controls.

3.13 PAINTING AND PIPE IDENTIFICATION

- A. Contractor is to refer to Division 9 and Section 200511.
- B. Identification by stenciling shall not be acceptable.
- C. On PVC jacketed piping, Contractor may utilize approved band markers at 4' to 6' intervals in lieu of painting. Markers shall also be used at specified intervals for fluid name and direction of flow.
- D. Material shall be submitted for approval. Color coded designated.

3.14 MECHANICAL EQUIPMENT ROOMS SHOP DRAWINGS

- A. Submit for approval prior to installation a complete layout, to scale drawing (not less than 1/4" = 1') of the rooms, actual equipment to be used and piping. Also, sections as required to indicate piping and equipment elevations.

END OF SECTION 220420

DIVISION 23 - MECHANICAL
SECTION 230620 - AIR CONDITIONING, HEATING & VENTILATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. General Provisions for Mechanical Work and all relevant documents are part of this work. References to specific paragraphs are intended to point out specific items to the Contractor, but in no way relieve him of responsibility of complying with all relevant parts of entire specification.

1.2 DESCRIPTION OF WORK

- A. Work shall consist of furnishing of all materials, equipment, tools, labor and transportation necessary for complete installation of heating, ventilation and air conditioning systems indicated and hereinafter specified.
- B. Work includes, but is not limited to, the following:
 - 1. Air Conditioning, Heating and Ventilation Systems
 - 2. Automatic Controls
 - 3. Air Distribution Systems
 - 4. Associated Piping and Insulation
 - 5. Accessory Items as Indicated and Specified Herein to Complete Systems

1.3 WORK OF OTHER SECTIONS

- A. Following work incidental to or related to mechanical work is provided under other Sections: Electrical wiring for power; masonry and roof openings for air intakes and exhausts; openings in walls, ceilings and floors; painting of ceiling outlets, grilles and other items installed as work of this Section outside of Equipment Rooms; flashing, counterflashing and roof curbs (unless specified as part of mechanical equipment). See Section 200511.

1.4 ELECTRICAL CHARACTERISTICS

- A. **Refer to Electrical Plans for exact service to each piece of equipment and coordinate with schedules herein and on Mechanical Plans. Any variations shall be brought to Architect's attention for a resolution prior to any equipment purchase.**

PART 2 - PRODUCTS

2.1 COVERING AND INSULATION

- A. General
 - 1. All materials shall be applied by Workmen skilled in this trade. Mechanical fasteners shall be used whenever possible to assure permanent construction. Unsightly work shall be cause for rejection.
 - 2. Materials will be applied only after all surfaces have been tested and cleaned.

3. All material shall be finished with surfaces having a maximum flame spread rating of 25 and smoke developed rating of 50 under A.S.T.M. method 84.
 4. Non-compressible insulation material shall be installed at hanger supports on cold piping to prevent damage to insulation and vapor barrier.
 5. All sizing and painting, pipe shields or saddles and internal duct insulation shall be provided under another section of the specifications.
 6. All insulation of cold surfaces shall be vapor sealed to prevent condensation.
 7. Insulation minimum thickness shall be as scheduled in this brochure; however, sufficient insulation shall be provided to eliminate condensation on the cold surfaces and to maintain a maximum exterior insulation surface of 125°F (OSHA Standard) on the hot surfaces.
- B. Refer to Sections 200511 and Divisions 22 & 23 for applicable work.
- C. Surfaces in duct and piping systems subject to sweating shall be insulated same as ducts and piping. All fittings, valve components, etc., in the systems shall be insulated to prevent sweating and the insulation assembly shall be made serviceable without complete disassembly.
- D. Insulation and protective covering shall have composite flame and smoke hazard ratings as tested in accordance with standard testing methods (NFPA 255 and UL 723). Composite ratings shall not exceed: Flame Spread 25, Smoke Developed 50 when tested per ASTM E 84. The insulation contractor shall certify in writing, prior to installation, that all products to be used will meet the above criteria.
- E. Supply, Return, and Outside Air Ductwork (Indoor Concealed): **(including** flexible, internally acoustic lined circular and oval duct) shall be externally insulated with **3"** fiberglass duct wrap .75 pcf with all service jacket facing and a "k" factor not to exceed .31 at 75°F. mean temperature. Flexible duct shall have integral external insulation. Insulation shall have a factory applied facing foil-scrimkraft fire resistant, U.L. rated. All insulation shall be applied to edges over-lapped 2 1/2" (wide tab duct wrap) and stapled in place 2" on center. Ducts over 36" shall be additionally secured with approved adhesive on bottom of duct. Joints to be taped with approved duct tape for size and pressure, Certain Teed Wide Tab Duct Wrap, or equal.
- F. Rectangular Duct Insulation: Provide external Insulation same as **Supply, Return and Outside Air** Ductwork.
- G. Condensate Drain Lines: Condensate drain lines above grade shall be covered with 1" thick foamed plastic flexible insulation tubing with butt or longitudinal joints secured with adhesive.
- H. Refrigerant Suction Piping: Shall be covered with 3/4" Armaflex thick flexible foamed plastic tubing with butt or longitudinal joints secured with approved adhesive. Owens Corning, or equal, Type O-C with O-C 520. Install in strict accordance with manufacturer's recommendations. All piping above grade, exposed to outdoors, shall be jacketed with 20mil aluminum. Seal to insure complete water tightness.
- I. Fixed Equipment: Insulate duct transitions, adapters, supply grilles, flexible ducts and **all system components subject to sweating and heat release.** Duct associated equipment shall be insulated same as ductwork.
- J. Pipe insulation shall be banded per manufacturer's recommendation.

- K. See Section 200511, Paragraph "Painting and Pipe Identification", and Division 9. **Items shall be painted as specified therein.**
- L. **Insulate all surfaces of diffusers that extend above the ceiling.** Provide detail for each type, prior to work, particularly those immediately adjacent to recessed light fixtures.

2.2 INLET DAMPERS

- A. Dampers: Control dampers shall have aluminum frames not less than 2" in width and blades of not less than No. 16 gauge aluminum, and shall be adequately braced to form a rigid assembly. No dampers shall have blades more than 12" wide. Two position dampers shall be of the louver type. Dampers shall be felt edged and shall have ball bearings. Dampers shall be low leakage type. Leakage shall not exceed 1% with 2,000 fpm approach velocity and 3" w.c. differential. Dampers to be designed for intake.
- B. Damper frame shall fit securely behind weatherproof louvers and a sealant shall be placed between the louver and the opening in the wall so as to prevent air leakage. Provide galvanized sheet metal sleeve as required.
- C. Dampers shall be electrically motorized to open when fans are operating as scheduled; 120V - 1 PH. Coordinate with HVAC Controls and Electrical to assure that the installation is complete and functioning.

2.3 PIPING, FITTINGS AND VALVES

- A. Provide piping systems as indicated on the plans and as specified herein. Refer to Section 200511 for applicable work to all piping installations.
- B. Unions or flexible connections shall be provided at piping connections to all equipment unless noted otherwise.
- C. **Provide dielectric unions between ferrous piping and copper piping.**
- D. Refrigerant Piping shall be new Type "K" copper, specifically processed for refrigerant service, with wrought copper fittings, all joints be routed and supported in a neat and workmanlike manner with clearances allowing for maintenance of all associated equipment. Final routing to be approved by Architect. **All piping sizes and routing shall be submitted to the equipment manufacturer for approval. Approved piping diagrams shall then be submitted to the Architect for approval prior to actual installation.**
- E. **Unions or flexible connections** shall be provided at piping connections to all equipment unless noted otherwise. Flanged unions shall be used for sizes above 2-1/2" with ratings same as for piping systems being served.
- F. Condensate Drain: **Type "K" Copper. Provide serviceable cleanouts. Follow manufacturer's installation manual, except drain size shall be minimum of one (1) size larger than recommended, if not sized otherwise on plan.**
- G. Valves and cocks shall be as indicated on Plans and specified below.
- H. **Provide access doors** to valves and equipment in accordance with Section 083113 as required to operate and service all concealed equipment and valves. Doors shall be of tamper-proof design. Where installed in a fire rated partition or ceiling, doors shall also be fire-rated to match the rating of the wall or ceiling.
- I. Valves and cocks shall be supported as specified in Section 200511.

2.4 HINGED DUCT ACCESS DOORS

- A. Hinged duct access doors shall be provided at all air control dampers, smoke dampers and fire dampers, and at all other apparatuses requiring service and inspection in the duct systems. Access door openings shall be 15" x 18" unless otherwise indicated. Where size of duct will not accommodate this opening, the doors shall be made as large as practicable. Access doors of rigid type, not less than 24" x 24", shall be provided having bronze pins and two approved brass fasteners. All doors 24" x 24" and over shall be provided with fasteners that can be operated from both sides. Access doors in plenums and ducts with thermal or acoustical lining shall be provided with the same lining.

2.5 SHEET METAL WORK

- A. Duct sizes on Plans are "metal to metal". Diffuser, grille and register sizes are nominal and do not include the flanges or framing.
- B. Low Velocity:
1. Unless otherwise noted on the plans and as specified here in below. Duct construction shall be in accordance with low, medium and high pressure duct construction recommendations, latest Equipment issues of the ASHRAE Guide and latest issue of SMACNA Standards. Where low pressure circular supply ducts are indicated on Plans, utilize above construction guides as minimum. Ducts shall be constructed of galvanized steel sheets, except as specified hereinafter, of following gauges. Traverse joints and bracing equal in strength and air tightness to that shown may be used.
 2. 26 gauge for ducts with maximum side up to 12". Traverse joints and bracing: S Slip, drive slip, 1" pocket lock on 8' centers.
 3. 24 gauge for ducts up to 30" in largest dimension. Traverse joints and bracing: S Slip, 1" pocket lock on 4' centers.
 4. 22 gauge for ducts 31" to 54" in largest dimension. Traverse joints and bracing: 1-1/2" standing S cleat, bar slip, pocket lock on 4' centers with 1-1/2" x 1-1/2" x 1/8" angles 2' from joint.
 5. 20 gauge for ducts 55" to 84" in largest dimension. Traverse joints and bracing: 1-1/2" standing S cleat, bar slip, pocket lock on 4' centers with 1-1/2" x 1/8" angles 2' from joint.
 6. 18 gauge for ducts above 85" in largest dimension. Traverse joints and bracing: 1-1/2" standing S cleat, bar slip, pocket lock on 4' centers reinforced with 1-1/2" x 1-1/2" x 3/16", or companion angles on 2' centers.
- C. Unlined sheet metal including offsets and elbows over 12" shall be cross broken on four sides at each section of each duct. Cross breaking may be omitted if metal two gauges heavier is used.
- D. Duct work shall be complete with required turning vanes, elbows, splitters and dampers. All work must be straight. An epoxy compound shall be used to seal small leaks.
- E. Wherever ducts divide, and where indicated, adjustable splitters shall be provided. Splitters shall have heavy duty quadrant. At branch duct take-offs, provide factory fabricated extractors with manual adjustments. For volume dampers, splitter dampers, volume extractors, etc., located above inaccessible, plaster, or concealed grid ceilings, provide and install air accessory regulator assembly. Regulator assembly shall include right angle worm gear regulator, 3/8" square shafts with length to reach from volume damper, splitter damper, extractor shaft to ceiling location and adjustable concealed damper regulator. Provide all couplings, screws, etc. to attach equipment to shafts and

ceilings as per manufacturer=s recommendations. Regulators in plaster or concealed grid ceilings shall be recessed type with chrome finish. Submit for approval. Where ducts change direction, provide approved guide vanes. Quadrants shall be accessible. At connections between duct work and fans or units, place flexible connections securely fastened to fan and duct work by galvanized iron straps. Unless otherwise indicated, included angle of divergence for enlarging ducts shall not exceed 20°, and included angle of convergence for contracting ducts shall not exceed 60°.

- F. **Note: Supply, return, transfer and outside air ducts shall be insulated externally as specified hereinbefore under “Covering and Insulation”.**
- G. Provide fire dampers, smoke dampers, or combination fire and smoke dampers as required by NFPA 90A, IBC and IMC, with accessories of installed in a rated ceiling or wall partition. **Grilles and diffusers located at fire rated ceilings and walls shall be constructed of steel, and have ceiling radiation damper where required by the NFPA 96A.**
- H. **Provide fire dampers, smoke dampers and/or combinations with accessories where openings are in a rated ceiling or wall.**
- I. **All Diffusers, Grilles and Registers shall be equipped with opposed blade dampers adjustable from Face.**
- J. Provide diffusers, grilles and registers as indicated. Sizes are actual grille sizes, not including the flange. **At fire rated ceiling or rated wall, diffusers and grilles shall be the same below except all steel with fire damper to maintain the ceiling or wall fire rating.**
 - 1. Square or Rectangular Ceiling Supply Diffusers:
 - a. **All shall be insulated in an approved manner to prevent condensation.**
 - b. Surface Mounted Ceiling Diffuser: In gypsum board, concealed grid ceiling, open exposed ceiling, or as noted by rectangular dimensions for ceiling diffuser, install extruded aluminum, removable cores, beveled frame diffusers with OBD opposed blade volume controllers, .063" frames and .050" vanes on 3" centers. White baked-on enamel finish. Anemostat Model DM, Titus TDC-AA, Metal-Aire Series 5000, equal. **At fire rated ceiling, diffusers shall be all steel with ceiling radiation fire damper to meet ceiling rating. In areas of exposed ductwork, without fire-rating, utilize same except extruded aluminum, mill finish, without fire damper.**
 - a. Lay-in Mounted Ceiling Diffusers: In acoustic tile lay-in ceilings, as noted by round neck size dimensions for ceiling diffuser, install extruded aluminum, round neck with collar, square face, lay-in panel type of 2'x2' suspended “T” bar acoustical tile ceiling as indicated. Opposed blade dampers. White baked-on enamel finish. Anemostat EPL, Titus TMS-AA, and Metal-Aire 5800 or equal. **At fire rated ceiling, diffusers shall be all steel with ceiling radiation fire damper to meet ceiling rating. In areas of exposed ductwork, without fire-rating, utilize same except extruded aluminum, mill finish, without fire damper.**
 - 2. Square or Rectangular Ceiling Return Air Grilles and Exhaust Grilles and Registers shall be equal to Anemostat Model GC5, 2" x 2" x 2" x .025" interlocked aluminum vanes and flat .055" extruded aluminum frame for surface or lay-in mounting as required per Architects finish schedule. Where two or more exhaust

grilles are connected to a duct system, and where indicated, they shall be Type GC50, **with opposed blade dampers**. Baked-on enamel white finish. Titus 50F, Metal-Aire CC-5D equal. At fire rated ceiling/deck assembly provide steel registers.

3. Sidewall Return Air Register shall be equal to Anemostat Model 30/ L/ 45, extruded aluminum construction, with steel opposed blade dampers. 0.055" aluminum frame with .063" extruded long horizontal (parallel to long dimension) aluminum blades, 45° deflection and 3/4" fin spacing. White finish. Approved equals: Titus 350FL and Metal-Aire Model RH. At fire rated wall/ceiling/deck assembly provide steel diffusers
4. Sidewall Supply Register shall be equal to Anemostat Model 20/S, extruded aluminum, double deflection supply registers with opposed blade dampers and Model DT-2M volume extractor. The front louvers shall be vertical (parallel to short dimension) and the rear louvers shall be horizontal with 3/4" louver spacing. The louvers shall be tapered from .170" to .025" thickness, set in 1-1/4" radiused extruded .055" thickness aluminum frame. The **opposed blade damper** shall have an 18 gauge steel frame and .051" thickness extruded aluminum blades. White coat finish. Approved equals: Titus 300FS, and Metal-Aire Model V4004DA. At fire rated wall/ ceiling/deck assembly provide steel registers.

K. Flexible Air Ducts:

1. **Use only as shown on Plans; maximum run of 10' allowed.**
2. **Elbows at Terminals: Provide 3" insulated rigid duct elbows at terminal neck.**
3. Flexible air ducts shall be listed by Underwriters Laboratories under UL 181 standards as a Class I flexible air duct material and complying with NFPA standards 90A and 90B. It shall be a factory fabricated assembly composed of a polymeric liner duct bonded permanently to a coated spring steel wire helix and supporting a fiberglass insulating blanket with fiberglass scrim. Low permeability outer vapor barrier of polyolefin material shall complete the assembly. Flexible duct shall be of top quality, high pressure design for use in low to high pressure heating and cooling systems. Bidirectional reinforced metalized vapor barrier shall not unravel. Extremely strong woven fiberglass fabric, with a flame resistant coating and permanently bonded to a coated spring steel wire helix, supporting a thick blanket of insulation and providing a double air seal.
4. Flexible air ducts shall be minimum length as possible and shall not exceed 4 feet in length, except as indicated otherwise on Plans.
5. Contractor shall not make tight bends with duct. All turns shall be long radius to prevent excessive pressure drop. Do not exceed manufacturer's published maximums.
6. Duct connections to collars shall be in accordance with duct manufacturer's recommendations. **Recommendations shall be a part of the submittal.**
7. Duct shall be rated for as follows:
 - a. Diameter: 4 - 20 inches ID
 - b. Pressure Rating: (WG)
 1. Positive: 10 inches (4" - 12" ID)
6 inches (14" - 16" ID)
4 inches (18" - 20"ID)
 2. Negative: 1 inch (4" - 12"ID)
2 inch (14" - 20"ID)

- c. Velocity: 5000 FPM
 - d. Temperature Range: -20°F to 200°F continuous
-20°F to 250°F intermittent
 - e. R Value: R-4.2
8. Flexible duct shall be connected to the rigid duct and terminal neck with a permanent, airtight connection utilizing taped joints with glue sealant and stainless steel (no nylon) screw type clamping straps.
9. Thermaflex Type M-KE (low and medium pressure) or equal by Flexmaster Type 3M-Insulated.

2.6 EXHAUST AND SUPPLY FANS

- A. Provide fans as indicated and scheduled. Fan capacities shall be certified by AMCA.
- B. **Centrifugal ceiling type or inline type exhausters** equal to Acme Master-ette VQ Series or Cook G Series, (GN inline; GC ceiling mounted). Motor shall be of heavy-duty type utilizing quiet running shaded pole with permanently lubricated bearings, built-in thermal overload and motor vibration isolated in rubber torsion mounting. Housing shall be lined with sound absorbing glass fiber and the aluminum centrifugal impeller shall be designed to insure quiet efficient operating. The fan shall be equipped for top discharge, recessed mounting in ceiling, rugged steel housing in bonderized finished baked enamel, attractive grille and ratings certified by AMCA. Provide weatherproof roof or wall vent as indicated, designed for this fan, aluminum construction, and galvanized birdscreen. Greenheck, Twin City fan.

2.7 AIR CONDITIONING SYSTEMS – HEAT PUMP - 2025 REFRIGERANT COMPLIANT SPLIT SYSTEMS

- A. Contractor shall provide summer and winter air conditioning systems as scheduled. Performance of each system shall be as specified herein and shown on the plans.
- B. **Systems shall be equal to outdoor and indoor units manufactured by Trane "Choice" Series. Models and performance as indicated.** Carrier "Comfort" Series, and Daikin North America are allowable equals; however, the final heat pump HVAC split system submitted and provided by the Contractor shall strictly meet the requirements of the Project Specifications herein, and Project Drawings. All accessories for controls & electrical shall be provided with equipment, and if not integral to the equipment shall be submitted for approval. **UNITS SHALL BE COMPLIANT WITH 2025 REFRIGERANT REGULATIONS, R-454B OR R34 REFRIGERANTS, AND UL 60335-2-40 REQUIRED FACTORY INSTALLED REFRIGERANT DETECTION SYSTEM (RDS), A2L SENSORS, ETC., TO STOP COMPRESSOR AND OPERATE BLOWER TO REDUCE CONCENTRATIONS IN OCCUPIED SPACES, AS PER FEDERAL & UL REGULATIONS AND MFG. REQUIREMENTS.**
- C. **Heat Pump Compressor-Condensing Unit:** Trane Technologies, "Choice" Series "5TWR50xxA1" as scheduled. Air cooled heat pump unit shall consist of base unit with cabinet enclosed refrigerant compressor, condenser coil with copper tubing and aluminum fins, blower and drive, and factory wired internal controls. The cabinet shall be protected for outdoor application and of bonderized steel with baked-on enamel finish and completely insulated. Compressor shall be Trane Climatuff scroll hermetic single-speed, type specifically designed for **R-454B (R34 permitted)** operation, resiliently mounted. Compressor shall have a positive lubricating system crankcase heater, current and temperature motor overload protection, suction discharge service valves, hot gas muffler and high pressure safety cutoff, heat pump reversing valve, freezestat, defrost control, weatherproof kit, high capacity liquid line dryer, service monitor light kit. Unit shall have protection against rapid recycling. An integral sub-cooler moisture indicating sight glass and high capacity liquid line filter-dryer, time delay relay, hinged steel

louvered panels on exterior cabinet to protect unit, hard start kit, compressor sound cover, refrigerant hi/low pressure switches, high density polyethylene unit support feet shimmed and bolted to concrete, shall also be included. Equipment shall operate satisfactorily down to 0°F outdoor air temperature, with proper low ambient cooling controls. Unit shall have a full refrigerant charge of **R-454B**, ARI and UL Certification. Indoor and Outdoor Units shall be equal to those manufactured by Trane with **seven years of warranty coverage for the compressor**, 20 years for the heat exchangers, seven years for all other parts, plus three years of coverage for the installation labor, and refrigeration warranty commencing upon acceptance of project substantial completion. Equipment shall meet performance and quality of Trane Models indicated. Outdoor unit certified per ARI 210/240. Unit design shall be of highest efficiency type as published in latest ARI Certified Directory and shall be so identified in the Shop Drawings submittal.

- D. **Systems** shall be air-to-air electric heat pump unit (outdoor unit) (Trane “Choice” series 1-Phase) in combination with a direct expansion fan-coil (indoor unit) (Trane 5TEM6) with electric strip heaters (1-phase) as scheduled. Units shall be designed and tested for use with R-454B and be equipped with refrigerant line fittings which permit mechanical or sweat connection.
- E. Coils shall be constructed with aluminum plate fins mechanically bonded to non-ferrous tubing, with all joints brazed.
- F. Outdoor units shall contain hermetically sealed compressor with oil pump, internal and external motor protection. Outdoor fan shall be propeller type, arranged for vertical discharge and direct driven by factory-lubricated motor. Seven (7) year compressor warranty; see warranty notes above.
- G. Indoor unit : Trane “Convertible” “M” Series, 5TEM6, air handler shall operate properly in either vertical upflow or horizontal position with ductwork, as indicated. Unit shall include electric resistance heater, filters, **TXV refrigerant control device** and indoor fan relay. Fan shall be centrifugal type. A single point (1 phase) for the electrical service connections shall be provided at the unit. Heaters shall be constructed in accord with N.E.C. Unit equipped with a programmable multi-speed blower motor and blower coil. Fan speed control relay kit for dehumidification control via airflow control. ECM variable speed constant torque fan. Air handlers are certified per ARI Standard 210/240.
- H. Controls and protective devices shall include a crank-case heater, liquid line low pressure stat, suction line accumulator and pressure relief device. Motor-compressor shall have both thermal and current sensitive overload devices and internal high-pressure protection. Outdoor unit wiring shall incorporate a positive acting timer to prevent compressor short cycling if power is interrupted. Device shall prevent compressor from restarting for a 5-minute period. An automatic defrost control shall be included to accomplish defrosting (only if required) every 90 minutes for a period of not more than 10 minutes. A 24-v transformer shall be factory installed and wired on outdoor units for external control circuit.
- I. Units shall have been sound retardant certified under ARI Standard 270.
- J. Provide adjustable auxiliary outdoor thermostat for each unit to allow control of electric strip heat above 0°F.
- K. **Heating and cooling capacities for air conditioning systems shall be as scheduled. Unit’s standard cooling rating shall be in accordance with ARI Standard.**
- L. **Installation of refrigerant pipe and sized and accessories shall be in accordance with manufacturer’s recommendations for tonnage installed. Submit for approval.**

Any recommendations not agreeing with that shown on Plans or specified herein shall be approved by Architect prior to installation. Also, complete system shall be evacuated per manufacturer=s recommendations and then filled with a full refrigerant charge. All external control wiring must be approved by Architect prior to installation.

- M. Condensate Drain Lines: Drain line sized at 1 pipe size larger than cooling coil drain outlet, unless noted otherwise. Cooling condensate drain lines above grade inside building shall be covered with 1" thick Owens-Corning or equal O-C flexible tubing with butt or longitudinal joints secured with O-C 520 or equal adhesive. See paragraph 2.1 Covering & Insulation for further information.
- N. System accessories shall include thermostat, outdoor thermostat, filter box with MERV 11, 1" thick 65% efficiency filters, factory mounted internal electric resistance heaters staged in accordance with NEC and schedule, automatic change over indoor thermostat and an outdoor thermostat which is set at the outdoor balance point temperature, heat pump piping package, indoor coil defrost thermostat, outdoor fan cycling thermostat, emergency heat control package, Time Guard control circuit and sequencer control.
- O. Thermostat: Touchscreen auto-changeover thermostat with humidity control shall be equal to Trane model "TCONT-XR303," or equal. Seven-day or 5-1-1 electronic programmable touchscreen T-Stat: 1-stage Cooling: 1-stage heat pump with humidity sensor; and 2-stage Heating: 1-stage heat pump + 1-stage electric heat. T-stat/humidistat shall operate heat pump CCU & unit heat coil to maintain temperature and relative humidity set points. T-stat features a real-time clock, keypad lock, ON/AUTO/CIRC/OFF fan control, dirty filter indicator, humidifier pad, and UV lamp service reminders. At all thermostats, install wall-mounted universal thermostat guard with heavy duty steel cover, and metal tumbler lock and key equal to Beko BTG-UM. The thermostat shall be equipped with battery back-up to keep time and date in the event of loss of power. Mount controller at 48" A.F.F., unless noted otherwise on plans; verify final location with Owner and A/E prior to installation.
- P. **NOTE:** Filter loading status shall be indicated at the thermostat controller.
- Q. Warranty: Indoor and Outdoor Units shall be equal to those manufactured by Trane with seven years of warranty coverage for the compressor, 20 years for the heat exchangers, seven years for all other parts, plus three years of coverage for the installation labor, and refrigeration warranty on entire unit commencing upon acceptance of project substantial completion.

2.8 FIRE DAMPERS, SMOKE DAMPERS AND COMBINATION FIRE/SMOKE DAMPERS

- A. Provide dampers as indicated on the drawings, and as specified herein.
- B. Unless otherwise noted, all fire dampers shall be tested in accordance with UL Standard 555 and bear the UL label for 1-1/2 hour rating.
- C. Fire dampers shall be supplied from one manufacturer to assure single responsibility. Manufacturer's submittal shall include a detailed schedule of dampers (location, size, etc.) installation instructions with mounting details, and complete specifications including metal gauges, pressure drop and leakage in accordance with AMCA Standard 500 testing.
- D. Curtain type fire dampers shall have blades out of the air stream and shall be provided with the proper style frame to match the duct work and application.
- E. Fire dampers shall be installed in openings utilizing sleeves, metal angles, and other material and practices necessary to provide an installation equivalent to the installation utilized by the fire damper manufacturer when damper was tested at Underwriters Laboratories. Provide access panels for service.

- F. Smoke and combination smoke-fire dampers shall be fail safe, closing on unit shut down or power failure. Dampers shall be furnished assembled in a sleeve from the factory with the motor, actuators and linkage mounted at the factory. Motor shall be mounted outside the air stream and shall be a two (2) position spring return motor with oil immersed gear train and a minimum rating of 50 square feet.
- G. Combination fire and smoke dampers shall have same rating as UL-555 and additionally rated Class III per UL-555 S.
- H. Wiring required to interconnect fire and smoke dampers with appropriate fire and/or smoke detection systems shall be furnished by Contractor.
- I. NOTE: Contractor shall furnish pneumatic or electric operators and motors, coordinating with all trades prior to purchase of any associated equipment. Actuator shall be (pneumatic or electric) as required by Plans and Specifications, with full clarification by Contractor prior to Bid.

2.9 VIBRATION AND NOISE CONTROL

- A. All new mechanical equipment shall be isolated from the structure by means of resilient vibration and noise isolators as scheduled and specified. All isolators and isolating material listed below and duct sound absorbers shall be supplied by single source to insure total responsibility for vibration and objectionable airborne noise. Isolation supplier shall be capable of furnishing necessary drawings and installation instructions required for project and shall possess necessary instruments to verify vibration and sound levels. Prior to acceptance of job by Owner, isolation supplier shall inspect job and furnish Architect with written certification that all isolation material furnished by him are installed in proper manner. Any deviations not approved by Architect shall be corrected by Contractor at his own expense.
- B. It is the intent of these specifications to provide a single source of supply for all noise and isolation products on this project.
- C. Vibration Isolation Hardware:
 - 1. Type 1 Mounts: Pre-compressed molded fiberglass isolation pads, neoprene jacketed and stabilized during manufacture. Pads shall be sized for 40 to 200 psi loading with a constant natural frequency of approximately 10.5 Hz. Glass fibers shall be produced by a multiple flame attenuation process which generates nominal fiber diameters not to exceed .00018 inches. Where the equipment base does not provide a uniform load surface, steel plates shall be bonded to the top of the pads.
 - 2. Type 2 Hangers - Neoprene coated, pre-compressed fiberglass hanger, encased in welded steel bracket with pad load plates. Same bracket and misalignment specs as Type 1.
- D. Piping Treatment: All piping except waste piping over 1" diameter in all mechanical equipment rooms and piping three supports away from other mechanical equipment shall be isolated from the structure by means of vibration and noise isolators. Suspended piping shall be isolated with fiberglass hangers in the supporting rods. Flexible members shall be incorporated in the piping adjacent to all isolated equipment.
 - 1. Type 3 Refrigerant Piping - Copper or stainless braided connectors suitable for pressures, temperatures and liquid/gas encountered. Units shall be installed without misalignment and elongation beyond the published face to face.

- E. Equipment Room Penetrations: All piping, conduit ductwork, etc., penetrating floors, ceilings, or partitions of equipment rooms shall be isolated using pre-compressed molded fiberglass pipe sleeves and tightly packed low density fiberglass. All penetrations shall be completely caulked with airtight suitable resilient sealant on both sides of penetration.
- F. Electrical Connections: There shall be no rigid electrical connections to isolated equipment. Flexible electric connections to all pieces of isolated equipment shall be minimum of 36" long and shall be installed in manner to provide slack in flexible connection.
- G. Sound Survey: The vibration and sound control supplier shall provide the engineer with a written sound analysis of each equipment room and each area adjacent to mechanical equipment rooms. The readings for this survey shall be taken when all furnishings are in place.
- H. **Vibration and Sound Control Schedule:**

Type of Equipment	Type of Base	Isolator	Location	Deflection
Inline & Cng. Mtd. Fan	None	Type 2 Hanger	Suspended	0.50"
Split System Blower Coil	None	Type 1	Around Perimeter of unit	0.25"

2.10 PIPE SEALS - FLOOR AND WALL PENETRATIONS

- A. Penetrations at exterior walls and Mechanical Equipment Room walls and floors by piping shall be sealed with a sleeve manufactured from non-metallic, non-corrosive, thermo-plastic material formed to have a water stop and anchor plate at least 4" larger than the main outside diameter and positioned in middle of sleeve body. Caps with nailing flanges shall be provided on each end. Link-Seal, Thunderline, or approved equal.

2.11 OWNER FURNISHED EQUIPMENT

- A. Contractor shall provide services to make final connections at all equipment provided and set in place by others, **including that furnished by Owner**. Work consists of providing all services with roughing-in as required by equipment supplier's shop drawings, including necessary pipes, valves, strainers, drips, traps, sheet metal, ducts, ventilation, controls, hot water, cold water, condensate, drain and gas.

2.12 DIELECTRIC ISOLATORS

- A. Where incompatible piping materials come into contact, except in connection with valves of materials different from pipe, install approved factory fabricated isolator in piping systems. Epco Type GX or FX, Maloney Type E, or Capital Type CS or F. Provide EPDM gaskets; Buna-N not allowed.
- B. Dielectric nipples are acceptable, equipment that does not require maintenance. ProFlo, Precision Plumbing products, or equal.

2.13 CONTROL SYSTEM - HEATING, COOLING & VENTILATION – UNITARY DIRECT EXPANSION EQUIPMENT

- A. **General: (See Plans for sequences).** Provide a complete new system of low voltage electric temperature controls for new equipment. Submit for approval shop drawings, diagrammatic layouts and sequence of operation to show all control equipment and function of each system. Submittal data shall consist of booklets containing data sheets for all items of equipment. Temperature controls and instrumentation covered by this specification shall be provided, installed and supervised by the same supplier in order to consolidate the responsibility. Control system shall consist of all thermostats, aquastats, valves, relays, transformers,

controllers, and other necessary equipment to provide automatic controls. **Interlocking with other equipment shall be provided.**

- B. **Smoke Control**: Smoke detectors shall be furnished and installed for all air units with over 2000 cfm, **under Division 26**. All wiring between these smoke detectors and the fire alarm panel shall be done by Electrical Contractor under Division 26. Detectors shall be equipped with type "C" contacts for wiring under this section so that whenever a smoke detector is in "alarm" it shall stop its appropriate unit fan operation.
- C. Temperature and humidity controls shall be manufactured by A/C Equipment manufacturer, or equal. Systems and components manufactured and installed as part of A.C. equipment unless otherwise required or noted, meeting all requirements of this section are acceptable. Systems shall be of latest state-of-the-art design, electric-electronic.
- D. Panels shall be completely factory pre-wired. Splices shall not be allowed between control cabinets and controllers. Systems shall be installed and adjusted by mechanics regularly employed by temperature controls supplier. Equipment shall be of manufacturer's first quality and shall be of full proportioning type, except as noted otherwise. At completion of installation, control subcontractor shall adjust, calibrate, set and check out all items of control equipment provided under contract to place them in complete operating condition subject to the approval of Architect. During guarantee period, control contractor shall provide any service and material required because of defective materials or faulty workmanship. Submit for approval shop drawings, diagrammatic layouts and sequence of operation to show all control equipment and function of each system. Framed sequence and operating instructions shall be provided and mounted in each Building. Submittal data shall consist of booklets containing data sheets for all items of equipment. Temperature controls and instrumentation covered by this specification shall be installed and supervised by the same supplier in order to consolidate responsibility of these systems, except as approved by Owner/Architect. Control system shall consist of all panels, controllers, sensors, thermostats and humidistats with **prior approved extra heavy duty protective covers**, valves, relays and all necessary equipment.
- E. **Wiring**: All conduit, wiring, etc. required for the installation and connection of control equipment shall be furnished and installed by Mechanical Contractor. Power wiring by Electrical Contractor. Contractor shall furnish required contactors, relays and transformers.
- F. **Air flow switches** shall be installed and prohibit electric heating coils in air units and ducts from operating without first having proof of air flow.
- G. **Dampers**: Motorized control dampers shall have frames not less than 2" in width and blades of No. 16 gauge galvanized steel, and shall be adequately braced to form a rigid assembly. Two position dampers shall be of the louver type. Dampers shall be felt edged and galvanized and shall have ball bearings. Dampers shall be low leakage type. Leakage shall not exceed 1% with 2,000 fpm approach velocity and 3" w.c. differential. Electric operator shall be sized for at least 25% more thrust than required for operation of the respective device in order to insure easy positive operation. Dampers and sheet metal related products shall be furnished and installed by the Sheet Metal Contractor. Damper actuators and linkages shall be furnished by Control Sub-contractor and installed by the Mechanical Contractor.
- H. **Access doors** or other approved means of access through ducts for service to all control equipment, including dampers, coils, valves, relays, transformers and controllers shall be provided.
- I. **Control Wiring Interlock**: **Contractor shall make complete** and coordinated interlock wiring and all supervisory central system wiring diagrams, obtain necessary diagrams from the successful manufacturers, and shall completely coordinate the interlock diagram. Provide diagram to electrical contractor for his installation. Interlock air unit fans with motorized inlet dampers such that dampers close when fan is not operating.

- J. **Thermostats:** All thermostats and sensors shall be as specified in air conditioning system specification, and located as directed by Architect. Controls which sequence heating and cooling cycles shall prevent simultaneously heating and cooling. The set point shall be externally adjustable. 48" AFF mounting height, unless noted otherwise on plans. **Submit for approval and provide all thermostats with lockable steel heavy duty covers, equal to Beko BTG-UM.**
- K. All dual control elements shall operate in sequence with automatic changeover.
- L. **Motors:** Valve and damper motors shall be capacitor type with oil immersed gear trains. Actuators shall be Johnson VA-8050 or approved equal.
- M. **Firestats:** Provide manual reset firestats in return air at blower coil and air handling units and in the suction of each exhaust fan above 600 cfm. Firestats shall stop associated fan on a rise in air temperature above 125°F for all systems.

PART 3 - EXECUTION

3.1 SHEET METAL WORK

- A. **Ductwork:**
1. Arrangement of ducts indicated is subject to reasonable revision to meet job conditions. Sheet metal work shall operate without excessive noise, chatter, vibration, or pulsation. Necessary allowances and provisions shall be made for beams, pipes, conduits, or other construction in building. Where necessary to avoid such items, ducts shall be transformed or divided with required duct cross-sectional area being maintained and streamlined teardrop deflectors provided to direct air around obstructions swallowed. The length shall be at least three times width of teardrop.
 2. Holes shall be laid out in sufficient time to permit leaving of proper openings. Costs caused by ill-timed work shall be borne by Contractor responsible. Holes must be of proper size to give clearance between ducts and floors and shall be equipped with fire dampers or fire doors as required by Pamphlets Nos. 80 and 90A of the National Board of Fire Underwriters. Ducts and return air openings passing through floors shall be provided with fire dampers. Dampers shall be installed with sufficient tension to prevent rattling or vibration. Spaces around ducts passing through ceilings, roofs and exterior walls shall be sealed. The material and installation shall provide for the fire and smoke rating of the wall, floor or ceiling penetrated.
 3. Outlets must be in symmetry with and avoid obstruction with surroundings. Where tile is used, symmetry must be maintained and sizes adjusted to conform to tile sizes. Grilles or ceiling outlets of the capacities indicated on the drawings shall be installed. Grilles and registers shall be furnished and installed in such manner as to distribute specified quantity of air evenly over the space intended without causing noticeable drafts of air moving over 50 f.p.m. in an occupied area, or dead spots in any part of the conditioned area. Contractor must verify that when handling air flows indicated, grilles and registers to be installed will not cause air noise and will have sufficient throw. Where grilles or ceiling outlets are prime coat finished and painting shall be done, it shall be responsibility of Contractor to install all outlets, to properly coordinate with plastering and painting of surrounding area and to protect them at all times, including during balancing and testing operation.
 4. Where sheet metal ducts, vents or flues penetrate roof, provide flashing and counterflashing assembly as necessary to make them watertight. The assembly and installation shall be in accord with Architectural Details.
 5. Necessary manual dampers for control of system shall be provided. Provide opposed dampers and return air dampers as indicated and as specified herein.

6. Ducts shall be supported from structure with galvanized strap hangers, 3/4" angle iron shall be used as additional support at hangers where duct is over three (3) feet in width.
7. Provide access panels to all concealed equipment requiring service or adjustments including, but not limited to, dampers, motors, controls, terminal boxes and valves.

3.2 PIPING, FITTINGS AND VALVES

- A. Piping shall be laid in a true line of tubes. **Exact routing shall be approved prior to work. Coordinate with all trades in Divisions 22, 23, & 26.**

3.3 INSTALLATION - COMPRESSOR - CONDENSING UNITS AND ASSOCIATED COOLING/HEATING SYSTEM COMPONENTS

- A. General: **Submit equipment and piping installation shop drawings.** Except as otherwise indicated, install air-cooled compressor-condensing and blower-coil units, including components and controls required for proper operation, **in accordance with manufacturer's instructions, and with recognized industry practices, to ensure that equipment complies with requirements and services intended purposes.**
- B. **Provide all auxiliary piping, solenoid valves, shut-off valves, protective devices, strainers, sight glasses, refrigerant piping accessories, and controls within unit and for ancillary systems as recommended by the equipment manufacturer.**
- C. Locate units in general position indicated in relation to other work. Position unit with sufficient clearance for normal service and maintenance, including clearance for cleaning, replacement and clearances for component replacement.
- D. Charge unit with refrigerant in quantity recommended by manufacturer. Bleed-out non-condensable gases. Test refrigerant system for leakage in manner recommended by manufacturer.
- E. Install gauges in positions where machine vibrations will not interfere with taking readings.
- F. Grounding: Provide positive equipment ground for equipment and components.
- G. Refrigerant piping shall be routed and supported in a neat and workmanlike manner with clearances allowing for maintenance of all associated equipment. Routing and accessories shall be approved by equipment Manufacturer and submitted as shop drawing prior to installation. **Prior to covering or making inaccessible.**

3.4 INSTALLATION - AIR HANDLING UNITS

- A. Install air handling units where indicated, in accordance with equipment manufacturer's written instructions, and with recognized industry practices, to ensure that units comply with requirements and serve intended purposes.
- B. **First unit assembly installed shall be observed by Architect prior to installation of others.**
- C. Coordinate with other work, including duct work, floor construction and piping, as necessary to interface installation of air handling units with other work.
- D. Install units on vibration mounts as indicated; comply with manufacturer's indicated z e z e installation method.

- E. Provide low voltage condensate overflow shut-off switch, equal to Safe-T-Switch model "SS2" by Rectorseal, at auxiliary drain outlet of indoor blower coil unit. Provide positive equipment ground for air handling unit components.
- F. As noted, provide emergency drain pans, with approved float switches to shut down system.

3.5 INSTALLATION - AUTOMATIC TEMPERATURE CONTROLS

- A. Provide thermostat guards, Honeywell TG511A 1000, Beko BTG-UM or equal.
- B. Framed sequence and operating instructions shall be provided and mounted in all Equipment Rooms.
- C. Valves, immersion wells and similar piping and control system accessories shall be provided by Contractor.
- D. Flow switches shall be provided by Contractor.
- E. Damper actuators and linkages shall be provided by Contractor.
- F. All control wiring shall be provided by Contractor.
- G. Thermostats and humidistats and switches at 48" AFF.

3.6 PIPING

- A. Piping shall be installed neatly in straight lines; excavations and backfill in accordance with manufacturer's manual, standards of industry, and Divisions 22 & 31.

3.7 ROUTING

- A. Piping and duct work shall be routed in a neat and workmanlike manner and offset as required for proper clearance. Final routing to be approved by Architect and Owner's Representative, prior to installation, and shall be arranged neatly.
- B. Various trades involved shall coordinate prior to commencing work so as to avoid interferences.
- C. All interferences with structural members and other building components shall be reviewed by Architect prior to starting work.

3.8 CLEANING

- A. All pipe and duct systems are to be installed in a manner to exclude all foreign material from the interior. The interiors shall be cleaned prior to installation. All ductwork shall be clean when installed, and kept clean during construction. All openings in ductwork shall be sealed except when attaching additional sections. **Ducts and air handling units, if allowed to get dirty, shall be cleaned prior to acceptance of the Project. Air handling units shall have permanent filters in place prior to and during all use.**

3.9 TESTING

- A. Test all piping and duct systems before they are covered concealed or made unavailable for complete inspection. Architect and Project Representative to witness.
- B. **Low Velocity Ductwork:** All supply, return, and exhaust ducts, plenums, and casings shall be tested before covering with insulation or concealed in masonry. Perform duct testing per

SMACNA's "HVAC Air Duct Leakage Test Manual. Conduct tests in presence of the Owner's Representative at static pressures equal to maximum design pressure of system or section being tested. If pressure classifications are not indicated, test entire system at maximum system design pressure. Do not pressurize systems above maximum design operating pressure. Give 24 hours advance notice for testing. All supply, return, and exhaust ducts, plenums, and casings, shall be tested and made substantially airtight at static pressure indicated for the system before covering with insulation or concealing in masonry. Maximum allowable leakage; comply with requirements for Leakage Classification 3 for round and flat-oval ducts, Leakage Classification 12 for rectangular ducts in pressure classifications less than and equal to 500 Pa (2" wg) (both positive and negative pressure), and Leakage Classification 6 for pressure classifications from 500 to 2490 Pa (2" to 10" wg). Visual inspection of all joints shall be made before headers and conduit branches may be installed or furred in as necessary for completion. Whistling noises at joints shall be corrected.

- C. **Refrigerant Pipe Testing:** Test new refrigerant piping in accord with equipment manufacturer's installation manual. To meet U.L. 60335-2-40 Section ADV 101, coils must be pressure tested, and leak tested to the high side design pressure of 610 psig. The assembled unit must be pressure tested, and leak tested to the low side design pressure of 250 psig. Pressure test warning: do not expose the low side of the compressor to pressures above 250 psig (R454B). **Submit test result Report for approval.**
1. Pressurize all coils to 350 psig with dry nitrogen & check for leaks. Release pressure.
 2. Shield personnel and pressurize all coils to 610 psig (1 second minimum) with dry nitrogen and visually check for gross leaks. Release pressure and remove shield.
 3. Perform a 250-300 psig nitrogen degradation test (or equivalent) (1 second minimum) on complete unit prior to helium test to minimize potential helium booth saturation. Release pressure.
 4. Evacuate system to 25 inches of mercury.
 5. Pressurize complete unit to 150-300 psig using helium; check for leaks using leak detector capable of sensing a leak of .000018 atm-cc/sec. of helium.
 - a. Unit must be in an area free of contaminants that are detectable by the leak test equipment.
 - b. Leak check compressor, all brazed connections, coils and coil end plates with the helium leak detector probe positioned 0.25" from the surface being checked and moving at a rate not to exceed 1 inch per second. The finned areas of the coils can be checked at a faster rate not to exceed 10 inches per second. Trace along the length of the coil with an approximate typical spacing of 4" between passes. Each face of the coil assembly should be checked as space allows.
 6. Release the helium gas from the unit.
 7. Evacuate the system until the system pressure stays under 1,000 microns 30 seconds with the vacuum pump isolated from the system.
 8. Any joints or piping that show leakage shall be taken apart, thoroughly cleaned, remade as new piping or joints and retested with dry nitrogen pressure and soap solution swabbing.
 9. If it passes the dry nitrogen test, fully recharge the system with refrigerant and perform a final test of the system with a halide torch or electronic leak detector.
- D. **All equipment shall be tested in presence of Architect and Owner's Project Representative to insure that it is performing as specified; twenty-four (24) hour prior notice required.**

3.10 PAINTING AND PIPE IDENTIFICATION

- A. **Contractor is referred to Section 200511 and Division 9 for requirements. All piping, ducts and other mechanical accessories that are not concealed shall be painted, except piping with PVC covering may be identified without painting with labels as specified hereinbefore.**

3.11 BALANCING, ADJUSTING AND OPERATION

- A. Contractor shall make adjustments to make certain that equipment and materials installed shall operate properly as specified herein and as indicated in accordance with good workmanship and equipment performance data, and shall certify that volume of air as specified is being delivered to all points of supply and return without objectionable drafts or hot or cold spots. Air delivered or exhausted in the system shall be tested if required by Architect.
- B. At request of Architect, Contractor shall make final balancing adjustments in presence of Architect. If necessary, he shall operate components of system, take readings, investigate deficiencies and repair damages caused by requirements of such readings or investigations. Control setting shall be checked for calibration and its proper operation shall be demonstrated.
- C. Heating, cooling and ventilating system components shall be checked by Contractor thoroughly for proper operation. Controls shall be checked and carefully calibrated, and proper operation demonstrated to Architect's Representative.
- D. Project Representatives shall be thoroughly checked out and instructed on operation of the systems and furnished with complete typed and framed set of operation instructions for each individual system. A minimum of 4 hours of instruction on operation of HVAC control systems shall be provided, 2 hours initial and 2 hours at 30 days following initial occupancy.
- E. Refer to 230980, Testing, Adjusting and Balancing.

END OF SECTION 230620

DIVISION 23 - MECHANICAL
SECTION 230980 - TESTING, ADJUSTING AND BALANCING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A.** Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this Section.

1.2 DESCRIPTION OF WORK

- A.** Extent of testing, adjusting, and balancing work is indicated by requirements of this Section, and also by drawings and schedules, and is defined to include, but is not necessarily limited to, air distribution systems, and associated equipment and apparatus of mechanical work and complete HVAC systems.
- B.** Component types of testing, adjusting and balancing specified in this Section include the following as applied to mechanical equipment:

Air-Conditioning Systems
Heating & Ventilating Systems
Ductwork Systems
Exhaust Systems
Control Systems

1.3 QUALITY ASSURANCE

- A.** **Note:** The job will not be accepted until this Section is complete and submitted in a timely manner, allowing time for analysis and changes as required in operating equipment.
- B.** **Installer:** A firm with successful testing, adjusting, and balancing experience on projects with testing and balancing requirements similar to those required for this project. **Firm shall not be installer** of system to be tested.
- C.** **NEBB Compliance:** Comply with NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems" as applicable to mechanical air hydronic distribution systems and associated equipment and apparatus, or AABC below.
- D.** **AABC Compliance:** AABC's Manual MN-1 "AABC National Standards", as applicable to mechanical air and hydronic distribution systems and associated equipment and apparatus.
- E.** **Industry Standards:** Comply with American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE) recommendations pertaining to measurements, instruments and testing, adjusting and balancing, except as otherwise indicated.

1.4 SUBMITTALS

- A.** Copies of the required forms and balancing procedures shall be submitted to the Architect's office for approval within 30 days following contract award.
- B.** **Maintenance Data:** Include in maintenance manuals, copies of certified test reports.
- C.** Submit certified test reports signed by Test and Balance Supervisor who performed TAB

work. Include identification and types of instruments used and their most recent calibration date with submission of final test report.

1.5 JOB CONDITIONS

- A.** Notify Architect and Owner's Project Representative of testing schedule prior to work.
- B.** Do not proceed with testing, adjusting and balancing work until work has been completed and is operable. Ensure that there is no latent residual work still to be completed.
- C.** Do not proceed until work scheduled for testing, adjusting, and balancing is clean and free from debris, dirt and discarded building materials.

PART 2 - PRODUCTS

2.1 PATCHING MATERIALS

- A.** Except as otherwise indicated, use same products as used by original Installer for patching holes in insulation, ductwork and housings which have been cut or drilled for test purposes, including access for test instruments, attaching jigs, and similar purposes.
- B.** At Tester's option, plastic plugs with retainers may be used to patch drilled holes in ductwork and housings.

2.2 TEST INSTRUMENTS

- A.** Utilize test instruments and equipment for Testing, Adjusting and Balancing (TAB) work required, of type, precision, and capacity as recommended in one of the following TAB standards:
 - 1.** **NEBB**: "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems".
 - 2.** **AABC**: "National Standards for Total System Balance".
 - 3.** **ASHRAE**: "ASHRAE Handbook, latest Systems Volume, Testing, Adjusting, and Balancing".

PART 3 - EXECUTION

3.1 TESTING, ADJUSTING AND BALANCING

- A.** Examine installed work and conditions under which testing is to be done to ensure that work has been completed, cleaned and is operable. Do not proceed with TAB work until unsatisfactory conditions have been corrected in manner acceptable to Tester.
- B.** Test, adjust, and balance environmental systems and components, as indicated, in accordance with procedures outlined in applicable standards.
- C.** Test, adjust and balance system during summer season for air conditioning systems and during winter season for heating systems, including at least period of operation at outside conditions within 5°F wet bulb temperature of maximum summer design condition, and within 10°F dry bulb temperature of minimum winter design condition. When seasonal operation does not permit measuring final temperatures, then take final temperature readings when seasonal operation does permit.
- D.** Duct Air Leakage Test Report: See paragraphs "Duct leakage Tests and Repairs" in

Section 230620, for TAB agency's role and responsibilities in witnessing, recording and reporting of deficiencies.

E. TAB tolerances allowed are as follows:

Air (CFM):

AHU's:	+0% to +5%
Diffusers	+/-5%
Outside Air	+0% to +10%
Exhaust	+/-2.5%

- F.** Prepare report of test results, including instrumentation calibration reports, in format recommended by applicable standards. **Clearly "note" any findings which do not conform with Plan requirements and industry standards of performance.**
- G.** Patch holes in insulation, ductwork and housing, which have been cut or drilled for test purposes, in manner recommended by original Installer.
- H.** Mark equipment settings, including damper control positions, valve indicators, fan speed control levers, and similar controls and devices, to show final settings at completion of TAB work. Provide markings with paint or other suitable permanent identification materials.
- I.** Clearly mark results which are outside accepted industry or Engineer's tolerances and prepare a report of recommendations for correcting unsatisfactory mechanical performances when system cannot be successfully balanced; including, where necessary, modifications which exceed requirements of contract documents for mechanical work.
- J.** Retest, adjust and balance systems subsequent to significant system modifications, and resubmit test results.

3.2 FURTHER WORK PROCEDURE, REPORTING AND DATA REQUIREMENTS

- A.** The balancing agency shall schedule his work in cooperation with other trades involved, visiting job at the beginning and during progress of the job, insuring that the necessary items to perform balancing are installed and said items are in proper locations, etc. The balancing and testing agency shall work with other crafts to cause the various systems to be installed in such a manner that balancing may be accomplished.
- B.** Within 30 days after balancing has been completed, balancing agency shall demonstrate to the Architect the accuracy of data as shown in the balancing report. If discrepancies appear, the systems shall be rebalanced and demonstrated again until accepted by the Architect. The Project Representative may be present at the Engineer's option. Provide written reports after each visit.
- C.** The following minimum information shall be included in finished report:
- 1. HVAC Units:** Location, manufacturer, model number, serial number, motor manufacturer, fan and motor sheaves, belts. Required and test data with unit operating at full air flow conditions (all space thermostats calling for cooling) for each of following: Total CFM, return and outside air CFM, discharge temperature & humidity, total static pressure, suction and discharge static, velocity, and total pressures across unit fan, HP, amperage, voltage, fan RPM. Verify performance of cooling and heating controls, damper operators, dampers, etc. Adjust and/or change pulleys and belts as required to obtain delivery of system specified or required full load air quantities.
 - 2. Cooling Coils:** Both specified and test data for each with full air

flow through coil. Coil air flow (CFM), entering and leaving air dry and wet bulb temperatures. Verify performance of each coil and controls. Also, test and report matching refrigerant compressor-condensing unit system component performance. Verify performance of coil and its temperature controls. See Paragraph 1.3 Standards of Quality Assurance.

3. **Supply Air Diffusers, Return and Exhaust Grilles:** Space served; type and size of diffuser or exhaust grille, specified CFM, initial test CFM and final test CFM. Each air outlet shall be adjusted of $\pm 5\%$ of required quantity as shown on plans.
4. **Exhaust Air Fans:** Service, manufacturer, model number, serial number, HP, voltage, rated and test amperage, test RPM, static pressure, required and test CFM, drive type, fan and motor sheaves and belt number.

END OF SECTION 230980

SECTION 26 00 00 - BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 709 (2017) Laminated Thermosetting Material

CODE OF FEDERAL REGULATIONS (CFR)

29 CFR 1910.147 Control of Hazardous Energy (Lock Out/Tag Out)

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, INC. (IEEE)

IEEE C2 (2023) National Electrical Safety Code

IEEE C57.12.28 (2014) Standard for Pad-Mounted Equipment - Enclosure Integrity

IEEE 100 (2000; Archived) The Authoritative Dictionary of IEEE Standard Terms

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA 250 (2020) Enclosures for Electrical Equipment (1000 Volts Maximum)

NEMA ICS 6 (1993; R2016) Industrial Control and Systems: Enclosures

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70 (2020) National Electrical Code

1.2 RELATED REQUIREMENTS

This section applies to all sections of Division 26, "Electrical," and Division 27, "Communications," of this project specification unless specified otherwise in the individual sections.

1.3 DEFINITIONS

- A. Unless otherwise specified or indicated, electrical and electronics terms used in these specifications, and on the drawings, shall be as defined in IEEE 100.
- B. The technical sections referred to herein are those specification sections that describe products, installation procedures, and equipment operations and that refer to this section for detailed description of submittal types.
- C. The technical paragraphs referred to herein are those paragraphs in PART 2 - PRODUCTS and PART 3 - EXECUTION of the technical sections that describe products, systems, installation procedures, equipment, and test methods.



1.4 ELECTRICAL CHARACTERISTICS

Electrical characteristics for this project shall be 120/240 volts, single phase, three wire, 60 Hz. Final connections to the power distribution system at the new service disconnect and at the pole mounted transformers shall be made by the Contractor as directed by the Design Professional and SWEPCO (AEP).

1.5 SUBMITTALS

Submittals required in the sections which refer to this section shall conform to the requirements of the Submittals Section and to the following additional requirements. Submittals shall include the manufacturer's name, trade name, place of manufacture, catalog model or number, nameplate data, size, layout dimensions, capacity, project specification and technical paragraph reference. Submittals shall also include applicable federal, military, industry, and technical society publication references, and years of satisfactory service, and other information necessary to establish contract compliance of each item to be provided. Photographs of existing installations are unacceptable and will be returned without approval.

- A. Manufacturer's Catalog Data: Submittals for each manufactured item shall be current manufacturer's descriptive literature of cataloged products, equipment drawings, diagrams, performance and characteristic curves, and catalog cuts. Handwritten and typed modifications and other notations not part of the manufacturer's preprinted data will result in the rejection of the submittal. Should manufacturer's data require supplemental information for clarification, the supplemental information shall be submitted as specified for certificates of compliance.
- B. Drawings: Include wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure a coordinated installation. Wiring diagrams shall identify circuit terminals and indicate the internal wiring for each item of equipment and the interconnection between each item of equipment. Drawings shall indicate adequate clearance for operation, maintenance, and replacement of operating equipment devices.
- C. Instructions: Where installation procedures or part of the installation procedures are required to be in accordance with manufacturer's instructions, submit printed copies of those instructions prior to installation. Installation of the item shall not proceed until manufacturer's instructions are received. Failure to submit manufacturer's instructions shall be cause for rejection of the equipment or material.
- D. Certificates: Submit manufacturer's certifications as required for products, materials, finishes, and equipment as specified in the technical sections. Certificates from material suppliers are not acceptable. Preprinted certifications and copies of previously submitted documents will not be acceptable. The manufacturer's certifications shall name the appropriate products, equipment, or materials and the publication specified as controlling the quality of that item. Certification shall not contain statements to imply that the item does not meet requirements specified, such as "as good as"; "achieve the same end use and results as materials formulated in accordance with the referenced publications"; or "equal or exceed the service and performance of the specified material." Certifications shall simply state that the item conforms to the requirements specified.

Certificates shall be printed on the manufacturer's letterhead and shall be signed by the manufacturer's official authorized to sign certificates of compliance.

- 1. Reference Standard Compliance: Where equipment or materials are specified to conform to industry and technical society reference standards of the organizations such as American National Standards Institute (ANSI), American Society for Testing and Materials (ASTM), National Electrical Manufacturers Association (NEMA), Underwriters Laboratories Inc. (UL), and Association of Edison Illuminating Companies (AEIC), submit proof of such compliance. The label or listing by the specified organization will be acceptable evidence of compliance.

2. Independent Testing Organization Certificate: In lieu of the label or listing, submit a certificate from an independent testing organization, competent to perform testing, and approved by the Design Professional. The certificate shall state that the item has been tested in accordance with the specified organization's test methods and that the item complies with the specified organization's reference standard.

E. Material and Equipment Manufacturing Date: Products manufactured more than three years prior to date of delivery to site shall not be used, unless specified otherwise.

1.6 QUALITY ASSURANCE

- A. Material and Equipment Qualifications: Provide materials and equipment that are products of manufacturers regularly engaged in the production of such products which are of equal material, design and workmanship. Products shall have been in satisfactory commercial or industrial use for 2 years prior to bid opening. The 2-year period shall include applications of equipment and materials under similar circumstances and of similar size. The product shall have been on sale on the commercial market through advertisements, manufacturers' catalogs, or brochures during the 2-year period. Where two or more items of the same class of equipment are required, these items shall be products of a single manufacturer; however, the component parts of the item need not be the products of the same manufacturer unless stated in the technical section.
- B. Regulatory Requirements: Equipment, materials, installation, and workmanship shall be in accordance with the mandatory and advisory provisions of NFPA 70.
- C. Alternative Qualifications: Products having less than a 2-year field service record will be acceptable if a certified record of satisfactory field operation for not less than 6000 hours, exclusive of the manufacturers' factory or laboratory tests, is furnished.
- D. Service Support: The equipment items shall be supported by service organizations which are reasonably convenient to the equipment installation in order to render satisfactory service to the equipment on a regular and emergency basis during the warranty period of the contract.
- E. Manufacturer's Nameplate: Each item of equipment shall have a nameplate bearing the manufacturer's name, address, model number, and serial number securely affixed in a conspicuous place; the nameplate of the distributing agent will not be acceptable.
- F. Modification of References: In each of the publications referred to herein, consider the advisory provisions to be mandatory, as though the word, "shall" had been substituted for "should" wherever it appears. Interpret references in these publications to the "authority having jurisdiction," or words of similar meaning, to mean the Design Professional.

1.7 NAMEPLATES

ASTM D 709. Provide laminated plastic nameplates for each panelboard; as specified in the technical sections or as indicated on the drawings. Each nameplate inscription shall identify the function and, when applicable, the position. Nameplates shall be melamine plastic, 0.125 inch thick, white with black center core. Surface shall be matte finish. Corners shall be square. Accurately align lettering and engrave into the core. Minimum size of nameplates shall be one by 2.5 inches. Lettering shall be a minimum of 0.25 inch high normal block style.

1.8 ELECTRICAL REQUIREMENTS

Electrical installations shall conform to IEEE C2, NFPA 70, and requirements specified herein.

1.9 MECHANICAL REQUIREMENTS

All control equipment to provide the proper sequence of operation shall be furnished and installed by the electrical contractor.

All conduit and wiring for control purposes shall be furnished and installed as work of this electrical section. All control wiring shall be color coded.

1.10 LOCKOUT REQUIREMENTS

Provide disconnecting means capable of being locked out for machines and other equipment to prevent unexpected startup or release of stored energy in accordance with 29 CFR 1910.147. Mechanical isolation of machines and other equipment shall be in accordance with requirements of Division 23, "Mechanical."

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 PAINTING OF EQUIPMENT

- A. Factory Applied: Electrical equipment shall have factory-applied painting systems which shall, as a minimum, meet the requirements of NEMA ICS 6 corrosion-resistance test.
- B. Field Applied: Paint electrical equipment as required to match finish of adjacent surfaces or to meet the indicated or specified safety criteria.

3.2 NAMEPLATE MOUNTING

Provide number, location, and letter designation of nameplates as indicated. Fasten nameplates to the device with a minimum of two sheet-metal screws or two rivets, or industrial adhesive.

END OF SECTION 26 00 00

SECTION 26 20 00 - INTERIOR DISTRIBUTION SYSTEM

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI C80.1 (2020) Electrical Rigid Steel Conduit (ERSC)

ANSI C80.3 (2020) Steel Electrical Metallic Tubing (EMT)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM B1 (2018) Hard-Drawn Copper Wire

ASTM B8 (2011; R2017) Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft

ASTM D709 (2017) Laminated Thermosetting Materials

INTERNATIONAL ELECTRICAL TESTING ASSOCIATION (NETA)

ANSI/NETA ATS (2021) Acceptance Testing Specifications

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA 250 (2021) Enclosures for Electrical Equipment (1000 Volts Maximum)

NEMA ICS 1 (2022) Industrial Control and Systems; General Requirements

NEMA ICS 6 (1993; R2016) Industrial Control and Systems: Enclosures

NEMA KS 1 (2013) Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum)

NEMA ST 20 (2021) Dry-Type Transformers for General Applications

NEMA TC 2 (2020) Electrical Polyvinyl Chloride (PVC) Tubing and Conduit

NEMA TC 3 (2021) Polyvinyl Chloride PVC Fittings for Use with Rigid PVC Conduit and Tubing

NEMA TC 14 (2015) Reinforced Thermosetting Resin Conduit (RTRC) and Fittings

NEMA WD 1 (1999; R2020) General Color Requirements for Wiring Devices

NEMA WD 6 (2021) Wiring Devices - Dimensional Requirements

NEMA Z535.4 (2011; R2017) Product Safety Signs and Labels



NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

- NFPA 70 (2020) National Electrical Code
- NFPA 70E (2021) Electrical Safety in the Workplace

UNDERWRITERS LABORATORIES INC. (UL)

- UL 1 (2005; Reprint Jan 2020) Flexible Metal Conduit
- UL 5 (15th Edition - May 2016) UL Standard for Safety Surface Metal Raceways and Fittings
- UL 6 (2007; Reprint Sep 2019) Electrical Rigid Metal Conduit - Steel
- UL 20 (2018; Reprint Jan 2021) General-Use Snap Switches
- UL 50 (2015) Enclosures for Electrical Equipment
- UL 67 (2018; Reprint Jul 2020) Panelboards
- UL 83 (2017; Reprint Mar 2020) Thermoplastic-Insulated Wires and Cables
- UL 360 (2013; Reprint Aug 2021) Liquid-Tight Flexible Steel Conduit
- UL 467 (11th Edition - Apr 2022) Grounding and Bonding Equipment
- UL 486A-486B (2018; Reprint May 2021) Wire Connectors
- UL 486C (2018; Reprint May 2021) Splicing Wire Connectors
- UL 489 (2016; Rev 2019) Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit-Breaker Enclosures
- UL 506 (2017; Reprint Jan 2022) Specialty Transformers
- UL 508 (2018; Reprint Jul 2021) Industrial Control Equipment
- UL 510 (2020) Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape
- UL 514A (2013; Reprint Aug 2017) Metallic Outlet Boxes
- UL 514B (2012; Reprint May 2020) Conduit, Tubing and Cable Fittings
- UL 651 (2011; Reprint May 2022) Schedule 40 and 80 Rigid PVC Conduit
- UL 797 (2007; Reprint Mar 2021) Electrical Metallic Tubing -- Steel
- UL 943 (2016; Reprint Feb 2018) Ground-Fault Circuit-Interrupters
- UL 1242 (2014; Reprint Aug 2022) Electrical Intermediate Metal Conduit -- Steel
- UL 1561 (2011; Reprint Jun 2015) Dry-Type General Purpose and Power Transformers

1.2 RELATED REQUIREMENTS

Section 26 00 00, "Basic Electrical Materials and Methods," applies to this section with additions and modifications specified herein

1.3 SUBMITTALS: Submit the following:

- A. Manufacturer's Catalog Data
 - 1. Surge Protective Devices (SPD)
- B. Drawings
 - 1. Panelboards

1.4 QUALITY ASSURANCE

In each standard referred to herein, consider the advisory provisions to be mandatory, as though the word "shall" has been substituted for "should" wherever it appears. Interpret references in these standards to "authority having jurisdiction," or words of similar meaning, to mean Design Professional.

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

Materials, equipment, and devices shall, as a minimum, meet requirements of UL, where UL standards are established for those items, and requirements of NFPA 70.

2.2 CONDUIT AND FITTINGS

Shall be rigid steel (zinc-coated) conduit, rigid nonmetallic conduit, intermediate metal conduit (IMC), electrical metallic tubing (EMT), flexible metal conduit, and liquid-tight flexible conduit, conforming to the following:

- A. Rigid Steel Conduit (Zinc-Coated): ANSI C80.1, UL 6.
- B. Rigid Nonmetallic Conduit: PVC Type EPC-40 in accordance with NEMA TC 2.
- C. Intermediate Metal Conduit (IMC): UL 1242, zinc-coated steel only.
- D. Electrical Metallic Tubing (EMT): UL 797, ANSI C80.3.
- E. Flexible Metal Conduit: UL 1.
 - 1. Liquid-Tight Flexible Metal Conduit, Steel: UL 360.
- F. Fittings for Metal Conduit, EMT, and Flexible Metal Conduit: UL 514B. Ferrous fittings shall be cadmium or zinc-coated in accordance with UL 514B.
 - 1. Fittings for Rigid Metal Conduit and IMC: Threaded-type. Split couplings unacceptable.
 - 2. Fittings for EMT: Steel or Die Cast compression type.
- G. Fittings for Rigid Nonmetallic Conduit: NEMA TC 3.

2.3 SURFACE RACEWAY

Surface raceway shall be UL 5, two-piece painted steel, totally enclosed, snap-cover type.

2.4 OUTLET BOXES AND COVERS

UL 514A, cadmium- or zinc-coated.

2.5 CABINETS, JUNCTION BOXES, AND PULL BOXES

Volume greater than 100 cubic inches, UL 50, hot-dip, zinc-coated, if sheet steel.

2.6 WIRES AND CABLES

Wires and cables shall meet applicable requirements of NFPA 70 and UL for type of insulation, jacket, and conductor specified or indicated. Wires and cables manufactured more than 12 months prior to date of delivery to site shall not be used.

- A. Conductors: Conductors No. 8 AWG and larger diameter shall be stranded. Conductors No. 10 AWG and smaller diameter shall be solid, except that conductors for remote control, alarm, and signal circuits, classes 1, 2, and 3, shall be stranded unless specifically indicated otherwise. Conductor sizes and ampacities shown are based on copper, unless indicated otherwise. All conductors shall be copper.
 - 1. Minimum Conductor Sizes: Minimum size for branch circuits shall be No. 12 AWG.
- B. Color Coding: Provide for service, feeder, branch, control, and signaling circuit conductors. Color shall be green for grounding conductors and white for neutrals; except where neutrals of more than one system are installed in same raceway or box, other neutral shall be white with colored (not green) stripe. Color of ungrounded conductors in different voltage systems shall be 120/240 volt, single-phase: black and red.
- C. Insulation: Unless specified or indicated otherwise or required by NFPA 70, power and lighting wires shall be 600-volt, Type THWN/THHN conforming to UL 83, except that grounding wire may be type TW conforming to UL 83; remote-control and signal circuits shall be Type TW or TF, conforming to UL 83. Where lighting fixtures require 90-degree Centigrade (C) conductors, provide only conductors with 90-degree C insulation or better.
- D. Bonding Conductors: ASTM B 1, solid bare copper wire for sizes No. 8 AWG and smaller diameter; ASTM B 8, Class B, stranded bare copper wire for sizes No. 6 AWG and larger diameter.

2.7 SPLICES AND TERMINATION COMPONENTS

UL 486A-UL486B for wire connectors and UL 510 for insulating tapes. Connectors for No. 10 AWG and smaller diameter wires shall be insulated, pressure-type in accordance with UL 486A-UL486B or UL 486C (twist-on splicing connector). Provide solderless terminal lugs on stranded conductors.

- A. Temperature Limitations: Contractor shall comply with the temperature limitations included in NEC Article 110-14(c). Ampacity rating of conductors shall be computed at the temperature rating of the equipment termination.

2.8 DEVICE PLATES

Provide UL listed, one-piece device plates for outlets to suit the devices installed. For metal outlet boxes, plates on unfinished walls shall be of zinc-coated sheet steel or cast metal having round or beveled edges. Plates on finished walls shall be nylon or lexan, minimum 0.03 inch wall thickness. Plates shall be same

color as receptacle or toggle switch with which they are mounted. Screws shall be machine-type with countersunk heads in color to match finish of plate. Sectional type device plates will not be permitted. Plates installed in wet locations shall be gasketed and UL listed for "wet locations."

2.9 SWITCHES

- A. Toggle Switches: UL 20, totally enclosed with bodies of thermosetting plastic and mounting strap. Handles shall be ivory. Wiring terminals shall be screw-type, side-wired. Switches shall be rated quiet-type AC only, 120/277 volts, with 20 amp current rating and number of poles indicated.
- B. Disconnect Switches: NEMA KS 1. Provide heavy duty-type switches where indicated, where switches are rated higher than 240 volts, and for double-throw switches. Switches serving as motor-disconnect means shall be horsepower rated. Provide switches in NEMA enclosure per NEMA ICS 6.

2.10 RECEPTACLES

UL 498 and NEMA WD 1, specification grade, heavy-duty, grounding-type. Ratings and configurations shall be as indicated. Bodies shall be of ivory thermosetting plastic supported on a metal mounting strap. Dimensional requirements shall be per NEMA WD 6. Provide screw-type, side-wired wiring terminals. Connect grounding pole to mounting strap.

- A. Weatherproof Receptacles: Provide in cast metal box with gasketed, weatherproof, cast-metal cover plate and gasketed cap over each receptacle opening. Provide caps with a spring-hinged flap. Receptacle shall be UL listed for use in "wet locations with plug in use."
- B. Ground-Fault Circuit Interrupter (GFI) Receptacles: UL 943, duplex type for mounting in standard outlet box. Device shall be capable of detecting current leak of 6 milliamperes or greater and tripping per requirements of UL 943 for Class A GFI devices.
- C. Dryer Receptacles: NEMA 14-30 configuration, rated 30 amperes, 125/250 volts. Furnish one matching plug with each receptacle. Hubbell #HBL 9430A, Leviton #278, or equal.
- D. USB Charger Type Duplex Convenience Receptacles: NEMA WD 1, NEMA WD 6 for standard configurations and UL498. Comply with USB batter charging spec USB BC1.2. Duplex, 20A, 125V, 2P, 3W, grounded with dual USB, type A and C, solid state charging ports, equal to Hubbell #USB20AC5W, or Leviton #T5833.
- E. Surge Protective Receptacles: UL 1449, duplex type for mounting in standard outlet box. Devices shall be capable of EMI/RFI noise filtering and point-of-use surge protection up to 18,000 amp total surge current.

2.11 PANELBOARDS

UL 67 and UL 50. Panelboards for use as service disconnecting means shall additionally conform to UL 869. Panelboards shall be circuit breaker-equipped. Design shall be such that individual breakers can be removed without disturbing adjacent units or without loosening or removing supplemental insulation supplied as means of obtaining clearances as required by UL. Where "space only" is indicated, make provisions for future installation of breaker sized as indicated. Panelboard locks shall be keyed same. Directories shall indicate load served by each circuit of panelboard. Directories shall also indicate source of service (upstream panel, switchboard, motor control center, etc.) to panelboard. Type directories and mount in holder behind transparent protective covering.

- A. Panelboard Buses: Support bus bars on bases independent of circuit breakers. Main buses and back pans shall be designed so that breakers may be changed without machining, drilling, or tapping. Provide isolated neutral bus in each panel for connection of circuit neutral conductors.

Provide separate ground bus identified as equipment grounding bus per UL 67 for connecting grounding conductors; bond to steel cabinet.

B. Circuit Breakers: UL 489, thermal magnetic-type having a minimum short-circuit current rating equal to the short-circuit current rating of the panelboard in which the circuit breaker shall be mounted. Breaker terminals shall be UL listed as suitable for type of conductor provided. Series rated circuit breakers and plug-in circuit breakers are unacceptable.

1. Multipole Breakers: Provide common trip-type with single operating handle. Breaker design shall be such that overload in one pole automatically causes all poles to open. Maintain phase sequence throughout each panel so that any three adjacent breaker poles are connected to Phases A, B, and C, respectively.

C. Manufacturer: GE Spectra bolt-on AVI, Square D Class 2441, Eaton Pow-R-Line series, or equal.

D. Identification: Provide engraved laminated-plastic or metal nameplate for each device, mounted with corrosion-resistant screws.

2.12 SURGE PROTECTIVE DEVICES (SPD)

SPDs shall comply with NFPA 70 and UL 1449 4th Edition, Type 1. SPDs shall be field-mounted (installed external to electrical equipment) for low-voltage (120 to 600 V) power distribution and control equipment and connected with leads as short as possible to main lugs or circuit breaker in panel as directed. The SPD for Service Entrance application shall provide temporary overvoltage protection in addition to surge protection.

A. Peak Surge Current Rating: The minimum single-pulse surge current withstand rating per mode shall not be less than the specified SPD rating. The peak surge current rating shall NOT be the arithmetic sum of the ratings of the individual MOVs in a given mode. SPD manufacturer shall provide independent 3rd party testing validating unit is capable of surviving a single surge at the specified rating. SPD types shall be provided as follows:

1. Service Entrance Suppressor (Type "A"): SPD shall be rated at 150,000 amps per mode for 120/240V, single phase, three wire for service entrance switchboards or panelboards.
2. Panelboard Suppressor (Type "B"): SPD shall be rated at 50,000 amps per mode for 120/240V, single phase, three wire for panelboards.

B. Protection modes and UL 1449 voltage protection rating (VPR) for 240/120V, single-phase, three-wire circuits shall not exceed the following:

240/120V

Line to Neutral:	700 V
Line to Ground:	700 V
Neutral to Ground:	700 V
Line to Line:	1200 V

C. SPD monitoring options shall include tri-color protection status indicator lights, audible alarm with silence switch, Form C contacts rated at 5 A and 250 V (one normally open and one normally closed) for remote monitoring of protection status, and surge counter which measures, discriminates between, and indicates the level of surges.

D. Install SPDs with conductors between suppressor and points of attachment as short and straight as possible and adjust circuit-breaker positions to achieve shortest and straightest leads. Do not splice

and extend SPD leads unless specifically permitted by manufacturer. Do not exceed manufacturer's recommended lead length. Do not bond neutral and ground. Use crimped connectors and splices only. Wire nuts are unacceptable.

- E. Enclosures shall be fiberglass reinforced polyester, rated for outdoor use (NEMA 3R).
- F. Provide start-up and testing services of a factory-authorized and factory-trained local service representative. The tests shall include:
 - 1. Off-line Testing: Impulse injection to verify the system tolerances as well as verification of proper facility neutral-to-ground bond. Compare field test results to factory benchmark test parameters supplied with each individual unit.
 - 2. On-line Testing: Verify that suppression and filtering paths are operating with 100% protection as well as verification of proper facility neutral-to-ground bond by measuring neutral-to-ground current and voltage and by visual inspection.
 - 3. Voltage measurements from Line-to Ground (L-G), Line-to-Neutral (L-N), Line-to-Line (L-L), and Neutral-to-Ground (N-G), taken at the time of the testing procedure.
- G. SPD shall be equal to ABB (Current Technologies) "TG3" or Schneider Electric "EM" Series, with warranty support for fifteen (15) years from date of Substantial Completion. Manufacturer agrees to repair or replace SPDs that fail in materials or workmanship within specified warranty period.

2.13 GROUNDING AND BONDING EQUIPMENT

UL 467. Ground rods shall be copper-clad steel, with minimum diameter of 3/4 inch and minimum length of 10 feet.

2.14 NAMEPLATES

Provide as specified in Section 26 00 00, "Basic Electrical Materials and Methods."

2.15 FIRESTOPPING MATERIALS

Provide asbestos free firestopping system capable of maintaining an effective barrier against flame and gases. System shall be UL listed and comply with ASTM E 814. Include UL system number, UL listed print from manufacturer for each type of floor, wall, and ceiling penetration.

PART 3 EXECUTION

3.1 INSTALLATION

Electrical installations shall conform to requirements of NFPA 70 and to requirements specified herein.

- A. Service Entrance Identification: Service entrance disconnect devices, switches, and enclosures shall be labeled and identified as such.
 - 1. Labels: Wherever work results in service entrance disconnect devices in more than one enclosure, as permitted by NFPA 70, each enclosure, new and existing, shall be labeled as one of several enclosures containing service entrance disconnect devices. Label, at minimum, shall indicate number of service disconnect devices housed by enclosure and shall indicate total number of enclosures that contain service disconnect devices. Provide laminated plastic labels conforming to paragraph entitled "Nameplates." Use lettering of at least 0.25 inch in height, and engrave on black-on-white matte finish. Service entrance disconnect devices in more than one enclosure, shall be provided only as permitted by NFPA 70.

- B. Wiring Methods: Provide insulated conductors installed in rigid steel conduit, IMC, rigid nonmetallic conduit, or EMT, except where specifically indicated or specified otherwise or required by NFPA 70 to be installed otherwise. Grounding conductor shall be separate from electrical system neutral conductor. Provide insulated green equipment grounding conductor for circuit(s) installed in conduit and raceways. Minimum conduit size shall be 1/2 inch in diameter for low voltage lighting and power circuits. Conduit which penetrates fire-rated walls, fire-rated partitions, or fire-rated floors shall be firestopped in accordance with the paragraph entitled "Firestopping Materials," specified in this section.
1. Low Voltage Wiring: Low voltage wiring such as telephone, computer, control, etc. which is run open above ceiling shall be bundled, neatly trained and supported independently from the suspended ceiling system. Wiring shall not be supported by ceiling tiles, t-bars, or ceiling support wires. Install in accordance with NEC Article 720-11 and ANSI/EIA/TIA-569. Do not support wiring from conduit, piping, or ductwork.

"Low voltage wiring shall be attached to the building structure at 4' on center (maximum), and routed as high as possible, free and clear of mechanical equipment, light fixtures, access panels and any other building equipment or items. Do not use tie straps or wire wraps to support cables. Each cable shall be continuous, with no splices from the source to the connected device. Routing shall be parallel or perpendicular to building walls. Support arrangement and tension on cables shall be sufficient to secure cables but shall not cause deformation or exceed minimum cable bending radius." Where wiring penetrates walls or ceilings, a metal conduit sleeve with bushings at each end, shall be provided for the penetration.
 2. Restrictions Applicable to EMT
 - a. Do not install underground.
 - b. Do not encase in concrete, mortar, grout, or other cementitious materials.
 - c. Do not use in areas subject to severe physical damage including but not limited to equipment rooms where moving or replacing equipment could physically damage the EMT.
 - d. Do not use in hazardous areas.
 - e. Do not use outdoors.
 3. Nonmetallic Conduit
 - a. Restrictions applicable to PVC Schedule 40
 - 1) Do not use above slab or grade.
 4. Restrictions Applicable to Flexible Conduit: Use only as specified in paragraph entitled "Flexible Connections."
 5. Underground Conduit: Rigid steel; steel IMC; PVC, Type EPC-40. Convert nonmetallic conduit to rigid, or IMC, steel conduit before rising through floor slab.
- C. Conduit Installation: Unless indicated otherwise, conceal conduit under floor slabs and within finished walls, ceilings, and floors. Keep conduit minimum 6 inches away from parallel runs of flues and steam or hot water pipes. Install conduit parallel with or at right angles to ceilings, walls, and structural members where located above accessible ceilings and where conduit will be visible after completion of project.
1. Conduit Support: Support conduit by pipe straps, wall brackets, hangers, or ceiling trapeze. Fasten by wood screws to wood; by toggle bolts on hollow masonry units; by concrete inserts or expansion bolts on concrete or brick; and by machine screws, welded threaded studs, or spring-tension clamps on steel work. Threaded C-clamps may be used on rigid steel conduit only. Do not weld conduits or pipe straps to steel structures. Load applied to fasteners shall not

exceed one-fourth proof test load. Fasteners attached to concrete ceiling shall be vibration resistant and shock-resistant. Holes cut to depth of more than 1 1/2 inches in reinforced concrete beams or to depth of more than 3/4 inch in concrete joints shall not cut main reinforcing bars. Fill unused holes. In partitions of light steel construction, use sheet metal screws. In suspended-ceiling construction, run conduit above ceiling. Do not support conduit by ceiling support system. Conduit and box systems must be supported independently of both (a) tie wires supporting ceiling grid system, and (b) ceiling grid system into which ceiling panels are placed. Supporting means shall not be shared between electrical raceways and mechanical piping or ducts. Installation shall be coordinated with above-ceiling mechanical systems to assure maximum accessibility to all systems. Spring-steel fasteners may be used for lighting branch circuit conduit supports in suspended ceilings in dry locations. Where conduit crosses building expansion joints, provide suitable expansion fitting that maintains conduit electrical continuity by bonding jumpers or other means.

2. Directional Changes in Conduit Runs: Make changes in direction of runs with symmetrical bends or cast-metal fittings. Make field-made bends and offsets with hickey or conduit-bending machine. Do not install crushed or deformed conduits. Avoid trapped conduits. Prevent plaster, dirt, or trash from lodging in conduits, boxes, fittings, and equipment during construction. Free clogged conduits of obstructions.
 3. Pull Wire: Install pull wires in empty conduits. Pull wire shall be plastic having minimum 200 pound tensile strength. Leave minimum 36 inches of slack at each end of pull wire.
 4. Locknuts and Bushings: Fasten conduits to sheet metal boxes and cabinets with two locknuts where required by NFPA 70, where insulated bushings are used, and where bushings cannot be brought into firm contact with the box; otherwise, use at least minimum single locknut and bushing. Locknuts shall have sharp edges for digging into wall of metal enclosures. Install bushings on ends of conduits, and provide insulating type where required by NFPA 70.
 5. Flexible Connections: Provide flexible steel conduit between 3 and 6 feet in length for equipment subject to vibration, noise transmission, or movement; and for motors. Install flexible conduit to allow 20 percent slack. Minimum flexible steel conduit size shall be 1/2 inch diameter. Provide liquidtight flexible conduit in wet and damp locations for equipment subject to vibration, noise transmission, movement or motors. Provide separate ground conductor across flexible connections.
- D. Boxes, Outlets, and Supports: Provide boxes in wiring and raceway systems wherever required for pulling of wires, making connections, and mounting of devices or fixtures. Boxes for metallic raceways shall be cast-metal, hub-type when located in wet locations, when surface mounted on outside of exterior surfaces, and when specifically indicated. Boxes in other locations shall be sheet metal. Each box shall have volume required by NFPA 70 for number of conductors enclosed in box. Boxes for mounting lighting fixtures shall be minimum 4 inches square, or octagonal, except that smaller boxes may be installed as required by fixture configurations, as approved. Boxes for use in masonry-block or tile walls shall be square-cornered, tile-type, or standard boxes having square-cornered, tile-type covers. Provide gaskets for cast-metal boxes installed in wet locations and boxes installed flush with outside of exterior surfaces. Provide separate boxes for flush or recessed fixtures when required by fixture terminal operating temperature; fixtures shall be readily removable for access to boxes unless ceiling access panels are provided. Support boxes and pendants for surface-mounted fixtures on suspended ceilings independently of ceiling supports, or make adequate provisions for distributing load over ceiling support members in an approved manner. Fasten boxes and supports with wood screws on wood, with bolts and expansion shields on concrete or brick, with toggle bolts on hollow masonry units, and with machine screws or welded studs on steel. In open overhead spaces, cast boxes threaded to raceways need not be separately supported except where used for fixture support; support sheet metal boxes directly from building structure or by bar hangers. Where bar hangers are used, attach bar to raceways on opposite sides

of box, and support raceway with approved-type fastener maximum 24 inches from box. When penetrating reinforced concrete members, avoid cutting reinforcing steel.

1. Boxes: Boxes for use with raceway systems shall be minimum 1 1/2 inches deep, except where shallower boxes required by structural conditions are approved. Boxes shall be minimum 4 inches square, except that 4 by 2 inch boxes may be used where only one raceway enters outlet.
 2. Pull Boxes: Construct of at least minimum size required by NFPA 70 of code-gauge aluminum or galvanized sheet steel, except where cast-metal boxes are required in locations specified herein. Provide boxes with screw-fastened covers. Where several feeders pass through common pull box, tag feeders to indicate clearly electrical characteristics, circuit number, and panel designation.
- E. Mounting Heights: Mount panelboards, circuit breakers, and disconnecting switches so height of operating handle at its highest position is maximum 78 inches above floor. Mount receptacles 18 inches above finished floor, and other devices, as indicated. Measure mounting heights of wiring devices and outlets to center of device or outlet.
- F. Conductor Identification: Provide conductor identification within each enclosure where tap, splice, or termination is made. For conductors No. 6 AWG and smaller diameter, color coding shall be by factory-applied, color-impregnated insulation. For conductors No. 4 AWG and larger diameter, color coding shall be by plastic-coated, self-sticking markers; colored nylon cable ties and plates; or heat shrink-type sleeves.
- G. Splices: Make splices in accessible locations. Make splices in conductors No. 10 AWG and smaller diameter with insulated, pressure-type connector. Make splices in conductors No. 8 AWG and larger diameter with solderless connector, and cover with insulation material equivalent to conductor insulation.
- H. Covers and Device Plates: Install with edges in continuous contact with finished wall surfaces without use of mats or similar devices. Plaster fillings are not permitted. Install plates with alignment tolerance of 1/16 inch. Use of sectional-type device plates are not permitted. Provide gasket for plates installed in wet locations.
- I. Electrical Penetrations: Seal openings around electrical penetrations through fire resistance-rated walls, partitions, floors, and ceilings utilizing proper firestopping materials to maintain fire resistive integrity.
- J. Grounding and Bonding: In accordance with NFPA 70. Ground exposed, non-current-carrying metallic parts of electrical equipment, metallic raceway systems, grounding conductor in metallic and nonmetallic raceways, and neutral conductor of wiring systems. Make ground connection to driven ground rods on exterior of building.
1. Resistance: Maximum resistance-to-ground of grounding system shall not exceed 5 ohms under dry conditions. Where resistance obtained exceeds 5 ohms, contact Design Professional for further instructions.
- K. Repair of Existing Work: Repair of existing work, demolition, and modification of existing electrical distribution systems shall be performed as follows:
1. Workmanship: Lay out work in advance. Exercise care where cutting, channeling, chasing, or drilling of floors, walls, partitions, ceilings, or other surfaces is necessary for proper installation, support, or anchorage of conduit, raceways, or other electrical work. Repair damage to buildings, piping, and equipment using skilled craftsmen of trades involved.

2. Existing Concealed Wiring to be Removed: Existing concealed wiring to be removed shall be disconnected from its source. Remove conductors; cut conduit flush with floor, underside of floor, and through walls; and seal openings.
 3. Removal of Existing Electrical Distribution System: Removal of existing electrical distribution system equipment shall include equipment's associated wiring, including conductors, cables, exposed conduit, surface metal raceways, boxes, and fittings, back to equipment's power source as indicated.
 4. Continuation of Service: Maintain continuity of existing circuits of equipment to remain. Existing circuits of equipment shall remain energized. Circuits which are to remain but were disturbed during demolition shall have circuits wiring and power restored back to original condition.
- L. Panelboard Modifications: At the completion of the project, the Contractor shall provide a new typed index for all panels in this building affected by this work.

3.2 FIELD QUALITY CONTROL

- A. Devices Subject to Manual Operation: Each device subject to manual operation shall be operated at least five times, demonstrating satisfactory operation each time.
- B. 600-Volt Wiring Test: Test wiring rated 600 volt and less to verify that no short circuits or accidental grounds exist. Perform insulation resistance tests on wiring No. 6 AWG and larger diameter using instrument which applies voltage of approximately 500 volts to provide direct reading of resistance. Minimum resistance shall be 250,000 ohms.
- C. Transformer Tests: Perform test classified as routine in accordance with NEMA ST 20 on each transformer.
- D. GFI Receptacle Test: Test GFI receptacles with a "load" (such as a plug in light) to verify that the "line" and "load" leads are not reversed.
- E. Grounding System Test: Test grounding system to ensure continuity, and that resistance to ground is not excessive. Test each ground rod for resistance to ground before making connections to rod; tie grounding system together and test for resistance to ground. Make resistance measurements in dry weather, not earlier than 48 hours after rainfall. Submit written results of each test to Design Professional, and indicate location of rods as well as resistance and soil conditions at time measurements were made.

END OF SECTION 26 20 00

SECTION 26 51 00 - INTERIOR LIGHTING

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI C78.377 (2017; R2022) American National Standard for Electric Lamps—Specifications for the Chromaticity of Solid State Lighting (SSL) Products

ILLUMINATING ENGINEERING SOCIETY OF NORTH AMERICA (IESNA)

IES HB-10-11 (2011; Errata 1 & 2: 2015) IES Lighting Handbook, Tenth Edition

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA SSL 1 (2016) Electronic Drivers for LED Devices Arrays, or Systems

NEMA SSL 6 (2010) Solid State Lighting for Incandescent Replacement—Dimming

NEMA SSL 7A (2015) Phase Cut Dimming for Solid State Lighting for Incandescent Replacement

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70 (2020) National Electrical Code

NFPA 101 (2021) Life Safety Code

UNDERWRITERS LABORATORIES INC. (UL)

UL 20 (2018; Reprint Oct 2020) General-Use Snap Switches

UL 924 (2016; Reprint May 2020) Emergency Lighting and Power Equipment

UL 1598 (2021; Reprint Mar 2021) Luminaires

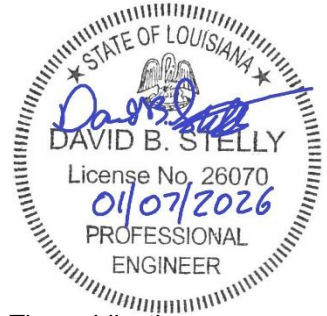
1.2 RELATED REQUIREMENTS

Section 26 00 00, "Basic Electrical Materials and Methods," applies to this section, with the additions and modifications specified herein. Materials not considered to be lighting equipment or lighting fixture accessories are specified in Section 26 20 00, "Interior Distribution System." Lighting fixtures and accessories mounted on exterior surfaces of buildings are specified in this section.

1.3 DEFINITIONS

A. Average Life: Time after which 50 percent will have failed and 50 percent will have survived under normal conditions.

B. Total Harmonic Distortion (THD): The root mean square (RMS) of all the harmonic components divided by the total fundamental current.



1.4 SUBMITTALS

Submit the following: Data, drawings, and reports shall employ the terminology, classifications, and methods prescribed by the IESNA HB-10-11, as applicable, for the lighting system specified.

A. Manufacturer's Catalog Data

1. Solid State (LED) lighting fixtures
2. Dimmer switch
3. Photocell switch
4. Exit signs
5. Emergency lighting equipment
6. Occupancy sensors

PART 2 PRODUCTS

2.1 SOLID STATE (LED) LIGHTING FIXTURES: ANSI C78.377A, NEMA SSL 1, UL 1598.

A. Provide the lumen output, wattage, and color temperature indicated.

B. Dimmer Switch: 0 -10 volt type for use with LED drivers.

2.2 PHOTOCCELL SWITCH

UL 773A, hermetically sealed cadmium-sulfide or silicon diode type cell rated 120 volts ac, 60 Hz with single-throw contacts. Switch shall turn on at or below 3 footcandles and off at 2 to 10 footcandles. A time delay shall prevent accidental switching from transient light sources. Provide switch is a cast weatherproof aluminum housing with adjustable window slide, rated 1800 VA, minimum.

2.3 EXIT SIGNS

UL 924, NFPA 70, and NFPA 101. Exit signs shall be self-powered type.

A. Self-Powered LED Type Exit Signs (Battery Backup): Provide with automatic power failure device, integral self-testing module and fully automatic high/low trickle charger in a self-contained power pack. Battery shall be sealed electrolyte type, shall operate unattended, and require no maintenance, including no additional water, for a period of not less than five years. LED exit sign shall have emergency run time of 1 1/2 hours (minimum).

2.4 EMERGENCY LIGHTING EQUIPMENT

UL 924, NFPA 70, and NFPA 101. Provide lamps in wattage indicated.

A. Emergency Lighting Unit: Provide as indicated. Emergency lighting units shall be rated for 6 volts. Provide integral self-testing module.

2.5 SELF-TESTING MODULE

Self-testing module for exit signs and emergency lighting equipment shall perform the following functions:

- A. Continuous monitoring of charger operation and battery voltage with visual indication of normal operation and of malfunction.
- B. Monthly discharge cycling of battery with monitoring of transfer circuit function, battery capacity and emergency lamp operation with visual indication of malfunction. The battery capacity test may be conducted by using a synthetic load.
- C. Manual test switch to simulate a discharge test cycle.

- D. Module shall have low voltage battery disconnect (LVD) and brown-out protection circuit.

2.6 OCCUPANCY SENSORS

UL listed. Occupancy sensors and power packs shall be designed to operate on the voltage indicated. Sensors and power packs shall have circuitry that only allows load switching at or near zero current crossing of supply voltage. Occupancy sensor mounting as indicated. Sensor shall have an LED occupant detection indicator. Sensor shall have adjustable sensitivity and adjustable delayed-off time range of five minutes to fifteen minutes, minimum. Wall mounted sensors shall be ivory, ceiling mounted sensors shall be white. Ceiling mounted sensors shall have 360 degree coverage unless otherwise indicated. Wall mounted sensors shall have integral manual "off" switch.

- A. Ultrasonic sensor shall be crystal controlled and shall not cause detection interference between adjacent sensors.
- B. Infrared sensors shall have a daylight filter. Sensor shall have a fresnel lens that is applicable for indicated usage.
- C. Ultrasonic/Infrared Combination Sensor

Occupancy detection to turn lights on required both ultrasonic and infrared sensor detection. Lights shall remain on if either the ultrasonic or infrared sensor detects movement. Infrared sensor shall have lens selected for indicated usage and daylight filter to prevent short wavelength infrared interference. Ultrasonic sensor frequency shall be crystal controlled.

PART 3 EXECUTION

3.1 INSTALLATION

Set lighting fixtures plumb, square, and level with ceiling and walls, in alignment with adjacent lighting fixtures, and secure in accordance with manufacturers' directions and approved drawings. Installation shall meet requirements of NFPA 70. Mounting heights specified or indicated shall be to the bottom of fixture for ceiling-mounted fixtures and to center of fixture for wall-mounted fixtures. Obtain approval of the exact mounting for lighting fixtures on the job before commencing installation and, where applicable, after coordinating with the type, style, and pattern of the ceiling being installed.

- A. Exit Signs and Emergency Lighting Units: Wire exit signs and emergency lighting units ahead of the switch to the normal lighting circuit located in the same room or area.
- B. Occupancy Sensor: Provide quantity of sensor units indicated as a minimum, provide additional units to have full coverage over controlled area. Full coverage shall provide hand and arm motion detection for office and administration type areas and walking motion for industrial areas, warehouses, storage rooms and hallways. Locate the sensor(s) as indicated and in accordance with the manufacturer's recommendations to maximize energy savings to avoid nuisance activation and deactivation due to sudden temperature or airflow changes and usage.

3.2 FIELD QUALITY CONTROL

Upon completion of installation, conduct an operating test to show that equipment operates in accordance with requirements of this section.

- A. Electronic Dimming Driver: Test for full range of dimming capability. Observe for visually detectable flicker over full dimming range.
- B. Occupancy Sensor: Test sensors for proper operation. Observe light control over entire area being covered.

END OF SECTION 26 51 00

SECTION 26 56 00 EXTERIOR LIGHTING

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO LTS (2013; 6th Edition; Rev 2022) Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI C136.3 (2014; 2020) Roadway and Area Lighting Equipment Luminaire Attachments

ANSI C136.21 (2024; R2019; 2014) Roadway Lighting Equipment - Vertical Tenons Used with Post-Top-Mounted Luminaires

ASTM INTERNATIONAL (ASTM)

ASTM A123/A123M (2017) Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

ASTM A153/A 153M (2016a) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

ILLUMINATING ENGINEERING SOCIETY OF NORTH AMERICA (IESNA)

IESNA HB-10-11 (2011; ERRATA 1 AND 2:2015) Lighting Handbook, 10th Edition

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE C2 (2023) National Electrical Safety Code NATIONAL ELECTRICAL

MANUFACTURERS ASSOCIATION (NEMA)

NEMA IA 10030 (2024) Standard for Industrial Controls and Systems

Enclosures NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

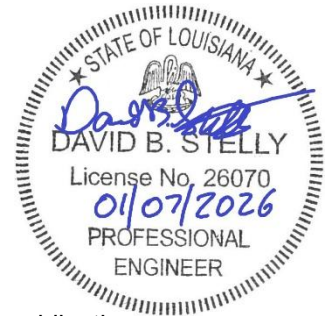
NFPA 70 (2020) National Electrical Code

UNDERWRITERS LABORATORIES INC. (UL)

UL 1598 (2021) Luminaires

1.2 RELATED REQUIREMENTS

Section 26 00 00, "Basic Electrical Materials and Methods," applies to this section, with the additions and modifications specified herein.



1.3 DEFINITIONS

- A. Average Life: Time after which 50 percent will have failed and 50 percent will have survived under normal conditions.

1.4 SUBMITTALS

Submit the following:

- A. Manufacturer's Catalog Data.
 - 1. Luminaires
 - 2. Steel poles (Aluminum poles acceptable)
- B. Drawings
 - 1. Luminaire drawings
 - 2. Poles
 - a. Luminaire Drawings: Include dimensions, effective projected area (EPA), accessories, and installation and construction details. Photometric data, including zonal lumen data, average and minimum ratio, aiming diagram, and candlepower distribution data shall accompany shop drawings.
 - b. Poles: Include dimensions, wind load determined in accordance with AASHTO LTS, pole deflection, pole class, and other applicable information.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Steel Poles: Do not store poles on ground. Support poles so they are at least one foot above ground level and growing vegetation. Do not remove factory-applied pole wrappings until just before installing pole.

PART 2 PRODUCTS

2.1 PRODUCT COORDINATION

Products and materials not considered to be lighting equipment or lighting fixture accessories are specified in Section 26 20 00, "Interior Distribution System". Lighting fixtures and accessories mounted on exterior surfaces of buildings are specified in Section 26 51 00, "Interior Lighting."

2.2 LUMINAIRES

UL 1598. Provide luminaires as indicated. Provide luminaires complete with lamps of number, type, and wattage indicated. Details, shapes, and dimensions are indicative of the general type desired, but are not intended to restrict selection to luminaires of a particular manufacturer. Luminaires of similar designs, light distribution, and brightness characteristics, and of equal finish and quality will be acceptable as approved.

2.3 POLES

Provide poles designed for wind loading of 100 miles per hour determined in accordance with AASHTO LTS while supporting luminaires having effective projected areas indicated. Poles shall be anchor-base type designed for use with underground supply conductors. Poles shall have oval-shaped handhole

having a minimum clear opening of by 5 inches. Handhole cover shall be secured by stainless steel captive screws.

- A. Steel Poles: AASHTO LTS. Provide steel poles having minimum 11-gage steel with minimum yield/strength of 48,000 psi and factory finish. Provide a pole grounding connection designed to prevent electrolysis when used with copper ground wire.

2.4 POLE FOUNDATIONS

Anchor bolts shall be steel rod having a minimum yield strength of 50,000 psi; the top 12 inches of the rod shall be galvanized in accordance with ASTM A 153/A 153M. Concrete shall be as specified in Section 03 30 00, "Cast-In-Place Concrete."

PART 3 EXECUTION

3.1 INSTALLATION OF POLES

IEEE C2, NFPA 70, and to the requirements specified herein.

- A. Steel: Provide pole foundations with galvanized steel anchor bolts, threaded at the top end and bent 90 degrees at the bottom end. Provide galvanized nuts, washers, and ornamental covers for anchor bolts. Thoroughly compact backfill with compacting arranged to prevent pressure between conductor, jacket, or sheath and the end of conduit ell. Adjust poles as necessary to provide a permanent vertical position with the bracket arm in proper position for luminaire location.

3.2 GROUNDING

Ground noncurrent-carrying parts of equipment including metal poles, luminaires, mounting arms, brackets, and metallic enclosures as specified in Section 26 20 00, "Interior Distribution System." Where copper grounding conductor is connected to a metal other than copper, provide specially treated or lined connectors suitable for this purpose.

3.3 FIELD QUALITY CONTROL

Upon completion of installation, conduct an operating test to show that the equipment operates in accordance with the requirements of this section.

END OF SECTION 26 56 00



SECTION 27 51 23 - INTERCOMMUNICATION SYSTEM

PART 1 - GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

ACOUSTICAL SOCIETY OF AMERICA (ASA)

ASA S3.2 (2020) American National Standard Method for Measuring the Intelligibility of Speech Over Communication Systems (ASA 85)

ELECTRONIC COMPONENTS INDUSTRY ASSOCIATION (ECIA)

ECIA EIA/ECA 310-E (2005) Cabinets, Racks, Panels, and Associated Equipment

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70 (2020) National Electrical Code

TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA)

TIA-568.0 (2020E) Generic Telecommunications Cabling for Customer Premises

TIA-568.1 (2020E) Commercial Building Telecommunications Infrastructure Standard

TIA-568.2 (2018D) Balanced Twisted-Pair Telecommunications Cabling and Components Standards

TIA-568.3 (2022-E) Optical Fiber Cabling Components Standard

UNDERWRITERS LABORATORIES (UL)

UL 50 (2015) UL Standard for Safety Enclosures for Electrical Equipment, Non-Environmental Considerations

UL 1449 (2021; Reprint Dec 2022) UL Standard for Safety Surge Protective Devices

1.2 RELATED REQUIREMENTS

Section 26 00 00, "Basic Electrical Materials and Methods" applies to this section with additions and modifications specified herein.

1.3 DESCRIPTION OF WORK

The work includes installation of a new intercom system for all buildings on the school campus, including material, tools, equipment, installation, and testing necessary for and incidental to the provision of a complete and usable system conforming to the applicable requirements of this specification. The system shall include new speakers, call buttons and wiring in all building and all necessary head-in equipment, raceways, outlet boxes and conductors where indicated on drawings. The equipment specified herein shall as a system provide a modular communications system capable of two-way communications between classrooms and the main office with public

address or all-call capability, bell scheduling, and emergency messaging. The system shall accommodate two separate zones for Upper Elementary (Admin Building, Classroom Wing, Nurse, Cafeteria & Gym) and Lower Elementary (Classroom Wing & Movement Room) areas of campus.

1.4 SUBMITTALS

Submit the following:

A. Manufacturer's Catalog Data

1. Classroom Speakers
2. Exterior Horn Speakers
3. Call Buttons
4. Administrative Console
5. Wire and Cable
6. Equipment Panels

Data which describes more than one type of item shall be clearly marked to indicate which type the Contractor intends to provide. Submit one original for each item and clear, legible, first-generation photocopies for the remainder of the specified copies. Incomplete or illegible photocopies will not be accepted. Partial submittals will not be accepted.

B. Drawings

1. System floor plans
2. System wiring diagrams
 - a. System Floor Plans: Submit shop drawings of the system floor plans showing locations of equipment mounted in racks and cabinets, and all other system devices.
 - b. System Wiring Diagrams: Submit complete wiring diagrams of the system showing points of connection and terminals used for all electrical connections in the system. Show all devices, wiring and equipment panels.

1.5 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years experience, and with service facilities within a 2 hour response time of project.
- B. Supplier: Authorized distributor of specified manufacturer with minimum three years experience.
- C. Installer: Authorized installer of specified manufacturer with service facilities within a 2 hour response time of Project.

1.6 ACCEPTABLE MANUFACTURERS

A. The Design Basis Intercom System is comprised of products manufactured by Valcom, 5614 Hollins Road Roanoke, Virginia 24019. The Design Basis System is a Valcom IP6000 series IP and analog hybrid based communication system, which shall be compatible with existing Valcom intercom systems installed in other Grant Parish Schools by Bit Happens, LLC, (318) 277-4614.

- B. Substitutions: Not allowed.

PART 2 PRODUCTS

2.1 SYSTEM DESIGN

A. Communication System

1. The Applications Server, Model VEIP6K-1, when used in a Class Connection IP6000 IP School Communications System shall provide scheduling, clock control and on demand distribution of WAV formatted audio to simultaneous groups of speakers per event. The server shall feature simple browser-based interface to facilitate easy manipulation of custom audio files for use as class change tones or emergency notification. Schedules shall be capable of automated initiation based upon day of the week, calendar date up to one year in advance and shall feature manual control capability. The 1U server shall utilize web browser access for setup of schedules, and real-time control. The server shall be capable of simultaneously operating multiple schedules, events per schedule and simultaneously occurring events.

B. System Functions:

1. Direct dialed, hands-free, two-way communication from all administrative telephones to classroom locations equipped with a talkback speaker.
2. Call button initiated hands-free, two-way communication from all classroom locations equipped with a talkback speaker to an administrative telephone.
3. Microprocessor based PoE system capable of handling unlimited end-points. An end-point is defined as a device with an IP address. The system IP speakers must be SIP compliant.
4. System shall be a VoIP system compatible with 45 ohm 2-way speakers, 25v 2-way speakers, self-amplified one-way speakers and VoIP speakers. The system should also have 1, 2 and 4 zone one-way gateways for common area announcements.
5. System shall interface with any SIP capable VoIP telephone system, analog telephone system, or single line telephone, thus allowing the school(s) to upgrade or replace their telephone system without suffering a requirement to replace, or lose any feature of, their internal communications (intercom) system. Any system that limits system features based upon any selected telephone system, and/or is proprietary to one or only a few telephone systems shall not be acceptable.
6. System shall be capable of converting and loading WAV files used for bells, announcements or music.
7. System shall be capable of initiating emergency notifications by internet browser from anywhere on the network.
8. System shall be capable of increasing volume by event. An event is defined as any WAV file or tone.
9. System shall be capable of downloading a graph (site, building, etc.) and arranging icons on it to play emergency announcements, back to school announcements, message from the Superintendent, etc.; any WAV file.
10. System shall automatically sound a tone over any loudspeaker connected for two-way communication to alert the classroom teacher that this two-way call has been established. This is intended to prevent unauthorized monitoring. The privacy tone must repeat every 15 (fifteen) seconds.
11. System shall be capable of distribution of emergency or general announcement(s) by Administration functions or from any authorized telephone to all areas furnished with a loudspeaker. Emergency announcements shall have the highest system priority.
12. Classroom speakers shall be software assignable to an unlimited number of audio groups. Provide the ability to define and archive unlimited time tone schedules with unlimited events per schedule. Each scheduled event shall be capable of controlling any internal tone, user selected custom WAV files, audio from any auxiliary source or up to 40 relays for building control. Each scheduled audio

event shall be distributable to any of the audio groups. The system shall feature the ability to automatically initiate unlimited schedules per day, based upon the day of the week or calendar dates up to one year in advance. The system shall feature the ability to operate 25 or more schedules simultaneously. Schedule administration, modification and creation functions must be available through an Internet browser. Systems that do not allow the school to manage their own schedules with an Internet browser do not offer calendar-based scheduling up to one year in advance or require separate page and time groups shall not be acceptable.

13. Provide 1 to 11 digits numbering plan, thus allowing the classroom speaker and the classroom telephone to be the same architectural number.
14. Programmable features shall be stored in non-volatile memory and shall not be lost due to power failures.
15. Classroom initiated intercom calls must be able to be assigned to ring at specific administrative ports. These administrative ports shall have the flexibility to be forwarded to other administrative ports should a call go unanswered or should the assigned administrative port be busy.

2.2 LOUDSPEAKERS

- A. Each classroom and other designated room shall be provided with a room loudspeaker. Eight (8) inch loudspeakers shall be provided in each classroom, staff area, administration area, hallways, common areas and as designated on plans.
- B. Classroom loudspeaker shall be Quam Model SOLUTION 1 or approved equal. The loudspeaker shall be an interior grade, wall mount or ceiling tile mount as indicated, complete loudspeaker assembly consisting of a 22 gage perforated steel baffle, fastened to a Factory installed loudspeaker and transformer, steel support bridge and steel UL Listed back can. Finish of the baffle shall be white baked epoxy hybrid. The loudspeaker shall be 8" O.D., the transducer voice coil shall be 19 mm (0.75 in) O.D.; the loudspeaker cone shall be constructed of molded paper fiber. The loudspeaker assembly shall be equipped with an integral dual voltage line transformer for either 25V or 70.7V systems. Five tap levels shall be available at 5W, 2.5W, 1.25W, 0.63W and 0.31W. Tap selection is by selecting and energizing color coded wire pigtail leads on the rear of the enclosure. Performance measurement and specification of a typical production unit shall conform to EIA 426A standards: Sensitivity (SPL at 1m [3.3 ft] with 2.83V input, averaged from 100 Hz to 10 kHz) shall be at least 92 dB-SPL. Usable frequency response shall extend from 65 Hz to 17 kHz (10 dB below rated sensitivity) with no external equalization. Rated power for nominal 8-Ohm unit shall be at least 12 W continuous pink noise. The loudspeaker assembly shall have a nominal conical polar coverage pattern of 90 degrees (at -6 dB point), averaged 500 Hz to 10 kHz. The complete loudspeaker assembly, shall weigh no more than 5 kg (11 lb). Packaging: Two complete loudspeaker assemblies in one shipping carton.
- C. Weatherproof Loudspeakers shall be Quam Model QH16T or approved equal. The loudspeaker shall be a double re-entrant trumpet type, consisting of a single compression-type transducer, installed in Factory assembled integral metal enclosure with integral metal projector bell. The loudspeaker will be furnished complete with adjustable, universal metal mounting flange. Finish: Tan enamel. The transducer voice coil shall be 25 mm (1.0 in) in diameter; the diaphragm shall be weather resistant phenolic composite. The loudspeaker assembly shall be equipped with an integral dual voltage line transformer for either 25V or 70.7V systems. Tap selection is by selector switch; four tap levels shall be available for 70.7V operation at 16W, 8W, 4W and 2W. Five tap levels shall be available for 25V operation at 16W, 8W, 4W and 2W and 1W. Audio connection to the loudspeaker is by binding head screw in an integral weather-resistant compartment. Performance measurement and specification of a typical production unit shall conform to EIA 426A standards:
 1. Sensitivity (SPL at 1m [3.3 ft] with 2.83V input, averaged from 100 Hz to 10 kHz) shall be at least 110 dB-SPL. Usable frequency response shall extend from 300 Hz to 15 kHz (10 dB below rated sensitivity) with no external equalization.
 2. Rated power for nominal 8 ohm unit shall be at least 16 W continuous pink noise.

3. The loudspeaker shall have a nominal conical polar coverage pattern of 110 degrees (at -6 dB point), averaged 500 Hz to 10 kHz. Overall trumpet bell diameter shall not exceed 225 mm (8.88 in), front to rear dimension shall not exceed 235 mm (9.19 in), the integral mounting flange shall be no smaller than 80mm (3.13 in). The loudspeaker shall weigh no more than 4.5 kg (10 lb).

- D. Attenuators shall be Quam Model QC10 or approved equal. The QC10 is a UL listed, single gang, 20W, ten-step, continuous rotary, audio level attenuator with an OFF position. Brushed, stainless steel faceplate with embossed positions and a black knob with white indicator mark.

2.3 CLASSROOM CALL-IN BUTTON

- A. The system shall allow for the use of normally open, normally closed call buttons.

2.4 MATCHING TRANSFORMERS

- A. Description: Tapped at 2, 1 and 2 watts with primary/secondary ratio to match amplifier to speaker impedances.

2.5 VOLUME PADS

- A. Description: Transformer type rated 10 watts.

2.6 WIRE AND CABLE

- A. The system shall use CAT-6 unshielded cabling.
- B. The system shall be capable of using two wire conductors for a speaker and call button referred from herein as a 2-wire circuit. It shall be possible to mix 2-wire and standard 4-wire circuits on the same switching/line card.
- C. It shall be possible to distribute the switching/line cards of the system up to 2700 feet using a single home run eight conductor cable.
- D. It shall be possible to network the system with additional systems using copper wire, single mode fiber optic and multimode fiber optic cables.
- E. Interior cabling shall be CAT-6 unshielded 22 AWG cable.
- F. Exterior cabling shall be fiber optic conductors between buildings provided as a part of the Fiber Optic Cable System. Provide all necessary hardware in the system necessary to use fiber optic cable to communicate between buildings.
- G. Provide fiber optic patch cords to connect the system equipment to the Fiber Optic Cable System. Patch cords shall be multimode, 62.5/125 micron, duplex fiber optic cable with two (2) SC style connectors at one end. Connectors at the opposite end shall be selected as required to connect to the system equipment. Provide Cord length as required to connect system equipment to the Fiber Optic Cable System using conduit routed above Systems room ceilings.

2.7 TERMINAL BLOCKS

- A. All intercom cables shall be terminated using CAT-6 RJ45 jacks and connected to CAT-6 RJ 45 patch panels. located in an Intercom Panel.

2.8 TERMINAL BLOCK ENCLOSURES

- A. NEMA 250, Type 1 steel enclosure.
- B. Continuous hinge cover with flush latch and key lock.
- C. Interior metal panel, for terminal block mounting, painted with white enamel.
- D. Enclosure finish: Manufacturer's standard gray enamel.
- E. Minimum size: 12"W x 18"H x 6"D.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Mounting Heights: Coordinate locations of outlet boxes specified in Section 260533 to obtain mounting heights indicated.
- C. Wall-mounted Speaker: 7 feet above finished floor.
- D. Call-in Switches: 4 feet above finished floor.
- E. Terminal Block Enclosures: 5 feet - 6 inches above finished floor to top of cabinet.
- F. Terminate all cable only at terminal block enclosures and end use equipment. Do not splice conductors.
- G. Make cable shields continuous at splices and connect speaker circuit shield to equipment ground only at amplifier.
- H. Install input circuits in separate cables and raceways from output circuits.
- I. Leave 18 inches excess cable at each termination at microphone, volume pad, speaker, and other system outlet.
- J. Leave 6 feet excess cable at each termination at system cabinet
- K. Provide protection for exposed cables where subject to damage.
- L. Connect reproducers to amplifier with matching transformers.
- M. Install equipment racks in location shown; arrange to provide adequate ventilation and access.
- N. Ground and bond equipment and circuits in accordance with Section 260526.
- O. Install all wiring in conduit. Conduit shall be adequate size for cables installed therein.
- P. Install fiber optic patch cords in conduit.

- Q. Install antenna on roof where not visible from ground level . Wall mount antenna above roof and above column line 7 near mid-point between column line CC and DD. Provide conduit and RG-6 cable from wall outlet box to system equipment.

3.2 ADJUSTING

- A. Adjust transformer taps for appropriate sound level.
- B. Adjust devices and wall plates to be flush and level.

3.3 TESTING

- A. Upon completion of the installation, the system must be tested by the manufacturer's representative and all necessary modifications and/or adjustments must be made to assure compliance with this specification.

3.4 SURGE SUPPRESSION

- A. Provide transient voltage surge suppression protection according to Section 263555, ATransient Voltage Surge Suppression@ on all TV cables between buildings and at all buildings.

3.5 DEMONSTRATION

- A. Conduct walking tour of Project. Briefly describe function, operation, and maintenance of each component.
- B. Use submitted operation and maintenance manual as reference during demonstration.

END OF SECTION

SECTION 28 31 00 - INTERIOR FIRE DETECTION AND ALARM SYSTEM

PART 1 - GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI C80.1 (2020) Electrical Rigid Steel Conduit (ERSC)

ANSI C80.3 (2020) Steel Electrical Metallic Tubing (EMT)

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME A17.1/CSA B44 (2019) Safety Code for Elevators and Escalators

BUILDER HARDWARE MANUFACTURERS ASSOCIATION (BHMA)

BHMA A156.15 (2021) Release Devices Closer Holder, Electromagnetic and Electromechanical

FACTORY MUTUAL ENGINEERING AND RESEARCH CORPORATION (FM)

FM P7825 Approval Guide (Updated on-line)

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, INC. (IEEE)

IEEE C62.41 (1991; R1995) Recommended Practice for Surge Voltages in Low-Voltage AC Power Circuits

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70 (2020) National Electrical Code - 2008 Edition

NFPA 72 (2022) National Fire Alarm Code

NFPA 90A (2021) Standard for the Installation of Air Conditioning and Ventilating Systems

NFPA 1221 (2019) Installation, Maintenance and Use of Emergency Services Communications Systems

UNDERWRITERS LABORATORIES INC. (UL)

UL FPED (2012) Fire Protection Equipment Directory

UL 5 (15th Edition - May 2016) UL Standard for Safety Surface Metal Raceways and Fittings

UL 6 (2007; Reprint Sep 2019) Electrical Rigid Metal Conduit - Steel



UL 467	(11 th Edition - Apr 2022) Grounding and Bonding Equipment
UL 497B	(2004; Reprint Feb 2022) Protectors for Data Communication and Fire Alarm Circuits
UL 514A	(2013; Reprint Aug 2017) Metallic Outlet Boxes
UL 514B	(2012; Reprint May 2020) Conduit, Tubing and Cable Fittings UL
797	(2007; Reprint Mar 2021) Electrical Metallic Tubing -- Steel
UL 1242	(2006; Reprint Apr 2022) Electrical Intermediate Metal Conduit -- Steel UL
1449	(2021) Surge Protective Devices
UL 1971	(2002; Reprint Aug 2018) Signaling Devices for the Hearing Impaired

1.2 RELATED REQUIREMENTS

Section 26 00 00, "Basic Electrical Materials and Methods" applies to this section with additions and modifications specified herein.

1.3 DESCRIPTION OF WORK

The work includes extension of the existing interior addressable, remote station reporting, fire alarm system including material, tools, equipment, installation, and testing necessary for and incidental to the provision of a complete and usable system conforming to the applicable requirements of NFPA 70, NFPA 72, NFPA 90A, and the Office of the State Fire Marshal and this specification. In referenced NFPA publications, the advisory provisions shall be mandatory, as though the word "shall" had been substituted for "should" wherever it appears; reference to the "authority having jurisdiction" shall be interpreted to mean the Design Professional. Materials and equipment to be furnished under this contract shall be essentially the current design products of manufacturers regularly engaged in production of such equipment and shall be listed by the Underwriters' Laboratories, Inc. in the UL FPED, or approved by Factory Mutual System and listed in FM P7825.

1.4 SUBMITTALS

Submit the following in the format required for review by the Office of the State Fire Marshal. The Contractor shall make his submittal through the Fire Marshal's website and shall name ADG, Inc. as the Professional of Record. He shall list the Architect's and the General Contractor's email address as "shared entities." ADG, Inc. must receive a system generated pin code to electronically verify the online submittal.

A. Manufacturer's Catalog Data

1. Control panel and modules
2. Storage batteries
3. Battery charger
4. Manual pull stations
5. Heat detectors
6. Open-area (spot-type) smoke detectors
7. Duct smoke detectors
8. Alarm speakers

9. Visible appliances
10. Main annunciator
11. Remote annunciator panel
12. Digital alarm communicating transmitter (DACT)
13. Voice Evacuation System

Data which describes more than one type of item shall be clearly marked to indicate which type the Contractor intends to provide. Submit one original for each item and clear, legible, first-generation photocopies for the remainder of the specified copies. Incomplete or illegible photocopies will not be accepted. Partial submittals will not be accepted.

B. Drawings

1. System floor plans
2. System wiring diagrams
 - a. System Floor Plans: Submit shop drawings of the system floor plans showing locations of initiating and indicating appliances and end-of-line supervisory devices. Show wire color coding, wire counts, and device wiring order. Show candela rating of each visible notification appliance.
 - b. System Wiring Diagrams: Submit complete wiring diagrams of the system showing points of connection and terminals used for all electrical connections in the system. Show all modules, relays, switches and lamps in the control panel.

C. Design Data

1. Power calculations
 - a. Power Calculations: Submit design calculations to substantiate that the battery capacity exceeds supervisory and alarm power requirements. Show comparison of the detector power requirements per zone versus the control panel smoke detector power output per zone in both the standby and alarm modes. Show comparison of the notification appliance circuit alarm power requirements with the rated circuit power output.

1.5 QUALITY ASSURANCE

- A. Qualifications of Installer: The Contractor or installer shall have satisfactorily installed fire alarm systems of the same type and design as specified herein and shall be licensed by the State of Louisiana as a Fire Alarm Contractor.
- B. Manufacturer's Representative: Provide the services of a representative or technician from the manufacturer of the system, experienced in the installation and operation of the type of system being provided, to supervise installation, adjustment, preliminary testing, and final testing of the system and to provide instruction to Owner's personnel.
- C. Qualifications of System Technician: Installation drawings, shop drawings and as-built drawings shall be prepared by, or under the supervision of, a qualified technician. Qualified technician shall be an individual who is experienced with the types of work specified herein, and is currently certified by the National Institute for Certification in Engineering Technologies (NICET) as an engineering technician with minimum Level III certification in fire alarm system program.

1.6 SPARE PARTS: Furnish the following spare parts:

- A. 5 complete sets of system keys
- B. 1 of each type of audible and visual alarm device installed
- C. 2 of each type of fuse required by the system
- D. 2 of each type of smoke detector base and head installed
- E. 1 smoke detector manufacturer's test screen, card or magnet for each 10 detectors, or fraction thereof, installed in the system

PART 2 - PRODUCTS

2.1 SYSTEM DESIGN

- A. Operation: Provide a complete, electrically supervised, remote station reporting, manual and automatic, addressable, annunciated, fire alarm system as described herein, and as shown on the drawings. Existing system is manufactured by Honeywell, Farenhyt series, and shall be extended by Diversifire, 1433 Natchitoches St, West Monroe, LA 71292, (318) 397-9800.

- 1. Fire Alarm Signal Initiation: Operation shall be such that actuation of any:

- a. Manual station
- b. Heat detector
- c. Smoke detector
- d. Automatic fire sprinkler system

Shall cause all of the following actions:

- a. All building evacuation alarm devices (notification appliances) to operate continuously;
- b. The annunciator(s) to properly register;
- c. A signal to be transmitted over the DACT;
- d. Heating, ventilating, and air conditioning equipment over 2000 CFM to shut down;

All operations shall remain in the alarm mode (except audible alarm notification appliances if manually silenced) until the system is manually restored to normal.

- 2. Supervisory Signal Initiation: Operation of a sprinkler control valve tamper switch shall not cause an alarm, but shall cause operation of common system audible trouble signal, and display of a visual indication distinct from that displayed to indicate a fire alarm or a fault in the supervisory circuit, and transmission of a distinct supervisory signal to the remote station.
- 3. Monitoring Integrity of Installation Conductors: All system circuits shall be electrically monitored for integrity including the following:
 - a. Initiating circuits.
 - b. Evacuation alarm (notification appliance) circuits (including both audible and visual notification appliances).
 - c. Battery power supply (low and no voltage across the standby battery terminals and open battery circuit).

Provide Class B initiating device circuits, and Class B notification appliance circuits as defined by NFPA72. A ground fault condition or single break in any other circuit shall cause operation of the system trouble signals. Loss of AC power, abnormal AC voltage, a break in the standby battery power circuit, or low battery voltage shall also cause operation of system trouble signals. The abnormal position of any switch in the control panel shall also cause operation of the system

trouble signals. Audible and visual equipment for supervision of the AC power supply shall be energized from the auxiliary DC power supply and vice versa. Trouble signals shall sound continuously until manually silenced or the system has been restored to normal. Electrical monitoring for integrity of wiring external of control panel for mechanical equipment shut down and magnetic door holding circuits is not required, provided a break in the circuit will cause doors to close and mechanical equipment to shutdown.

4. Walk-Test Mode: Provide system with walk-test mode to allow one person to test alarm and supervisory features of initiating devices. Walk-test mode shall be enabled from the control panel by authorized service personnel. Control panel shall display a unique visual indication when system is in walk-test mode. If testing ceases while in walk-test mode, after a preset delay system shall automatically return to normal standby mode.
 5. Alarm Verification Feature: System shall have a smoke detector alarm verification feature. Upon activation of any area smoke detector, system shall institute an alarm verification process prior to enabling of the alarm functions as specified herein. Activation of any initiating device other than an area smoke detector shall cause immediate enabling of system into alarm mode. If an alarm input from a smoke detector on the initial zone in alarm is present at the end of an initial delay period not exceeding 20 seconds, all alarm functions as specified herein shall be immediately enabled. If a smoke detector alarm input is not present at the end of the initial delay period, a second-stage confirmation period of one minute shall be initiated. If a smoke detector alarm input is received during the second-stage confirmation period, all alarm functions shall be immediately enabled. During the verification process, activation of any area smoke detector on any zone other than the initial zone in alarm shall also cause system to go into alarm mode immediately. If no smoke detector alarm input occurs within the second-stage confirmation period, system shall reset to normal. Any alarm input received from an area smoke detector after the second-stage confirmation period has elapsed shall cause system to institute a new verification process.
- B. Primary Power: Primary power source shall be 120 volts AC service, transformed through a two winding isolation type transformer and rectified to 24 volts DC for operation of all initiating device, notification appliance, signaling line, trouble signal and transmitter tripping circuits. The alarm current draw of the entire fire alarm system shall not exceed 80 percent of the rated output of the system power supply module(s). Obtain AC operating power as shown on contract drawings.
- C. Auxiliary Power: Provide secondary DC power supply for operation of system in the event of failure of the AC source. Transfer from normal to emergency power or restoration from emergency to normal power shall be fully automatic and shall not cause transmission of a false alarm. Loss of AC power shall not prevent transmission of a signal to station fire alarm headquarters upon operation of any initiating circuit.
1. Storage Batteries: Provide sealed lead calcium or sealed lead acid batteries and charger. Drycell batteries are not acceptable. House batteries in the control panel or in a well constructed vented steel cabinet with cylinder lock, non-corrosive base, and louvered vents. Provide batteries of adequate ampere-hour rating to operate the system, including audible trouble signal devices, and transmitter tripping circuits under supervisory conditions for 24 hours, at the end of which time batteries shall be capable of operating the entire system in a full alarm condition for not less than five (5) minutes. Provide calculations substantiating the battery capacity. Provide reliable separation between cells to prevent contact between terminals of adjacent cells and between battery terminals and other metal parts. When a separate battery cabinet is used, provide a fuse block for battery leads within the cabinet. Finish the cabinet on the inside and outside with enamel paint. Locate the top of the batteries not more than 4 feet (4') above floor level.

2. Battery Charger: Provide completely automatic high/low charging rate type capable of recovery of the batteries from full discharge to full charge in 24 hours or less. Provide a trouble light to indicate when batteries are manually placed on a high rate of charge as part of the unit assembly if a high-rate switch is provided. House charger in the control panel or battery cabinet.

2.2 COMPONENT DESIGN

- A. Control Panel: Provide modular type panel installed in a surface mounted steel cabinet with hinged door and cylinder lock. Mount with panel centerline 5 feet above finished floor elevation. Switches and other controls shall not be accessible without the use of a key. The control panel shall be a neat, compact assembly containing all parts and equipment required to provide specified operating and supervisory functions of the system. Each control panel component shall be UL listed or FM approved and approved by the control panel manufacturer for use in the control panel. Panel cabinet shall be finished on the inside and outside with factory-applied enamel finish. Provide main annunciator located on the exterior of the cabinet door or visible through the cabinet door. Provide audible trouble signal. Provide permanent engraved rigid plastic or metal identification plates, or silk-screened labels attached to the rear face of the panel viewing window, for all lamps and switches. Provide a common system Form C dry alarm contact, and a common system Form C dry trouble contact. Permanently label all switches. Provide panel with the following switches:
 1. Trouble silencing switch which silences audible trouble signals (including remote trouble devices, if provided) without extinguishing trouble indicating lamp(s). For non-self-resetting type switch, upon correction of the trouble condition, audible signals will again sound until the switch is returned to its normal position. For silencing switch of the momentary action, self-resetting type, the trouble signal circuit shall be automatically restored to normal upon correction of the trouble condition.
 2. Evacuation alarm silencing switch which when activated will silence all alarm notification appliances without resetting the panel, and cause operation of system trouble signals. Subsequent alarm(s) from additional zone(s) not originally in alarm shall cause activation of the notification appliances even with the alarm silencing switch in the "silenced" position.
 3. Reset switch which when activated will restore the system to normal standby status after the cause of the alarm has been corrected, and all activated initiating devices reset. Operation of reset switch shall restore activated smoke detectors to normal standby status.
 4. Lamp test switch.
 5. Drill switch which will enable test of notification appliances and restoration to normal without tripping the DACT.
 6. HVAC shutdown bypass switch. Operation of the switch shall allow HVAC system to operate with detectors in alarm and shall cause operation of system trouble signals.

The control panel shall be equipped with system walk test features and shall include the following:

- a. Voice Evacuation System: Upon activation, the Voice Evacuation System shall sound the temporal pattern signal for one minute followed by a prerecorded voice message. This evacuation signal shall sound continuously until such time as the manual station or automatic detector is restored to normal and the fire command station reset. To prevent premature aborting of the fire alarm signal, the system shall be designed so that no one can silence that signal before one (1) minute operation has elapsed.
- b. Prerecorded message module shall contain a digitized message player. Power shall come on to the player when an alarm condition is detected or when transmission is commanded manually from the Voice Alarm System.

- B. Main Annunciator: Provide integral with the control panel. Provide 80-character LCD display located on the exterior of the cabinet door or visible through the cabinet door. The display shall provide specific identification of the device by means of a permanent label. In no case shall zone identification consist of the words "Zone 1," "Zone 2," etc., but shall consist of the description of the device.
1. Remote Annunciator Panel: Provide panel located as shown. Mount with panel centerline 5 feet above finished floor elevation. Panel shall duplicate all requirements specified for the control panel annunciator. Panel shall be of the interior type, flush-mounted. Provide panel with an integral audible trouble sounder which shall operate in conjunction with control panel audible sounder. Provide panel with trouble silence switch which shall comply with the requirements for a trouble silencing switch as specified in paragraph entitled "Control Panel".
- C. Addressable Manual Pull Stations: Provide noncoded single action type with mechanical reset features. Stations shall be semi-flush mounted and interior type as indicated. Equip each station with a terminal strip with contacts of proper number and type to perform functions required. Stations shall be a type not subject to operation by jarring or vibration. Break-glass-front stations are not permitted; however, a pull-lever break-rod type is acceptable provided presence of rod is not required to reset station. Station color shall be red. Station shall provide visible indication of operation. Restoration shall require use of a key. Keys shall be identical throughout the system for all stations and control panel(s). Mount stations with operating lever at 4 feet above finished floor. Provide electronics for communicating with the fire alarm panel.
- D. Addressable Heat Detectors: Provide detectors designed for detection of fire by combination fixed temperature rate-of-rise principle. Locate detectors in accordance with their listing by UL or FM and the requirements of NFPA 72. Mount detectors at the underside of ceiling or deck above unless otherwise indicated. Temperature rating of detectors shall be in accordance with NFPA 72. No detector shall be located closer than 12 inches to any part of any lighting fixture nor closer than 24 inches to any part of an air supply or return diffuser. Detectors, located in areas subject to moisture or exterior atmospheric conditions or hazardous locations as defined by NFPA 70, shall be types approved for such locations. Provide with terminal screw type connections. Removal of detector head from its base shall cause activation of system trouble signals if detectors are provided with separable heads and bases. Provide electronics for communicating with the fire alarm panel.
1. Combination Fixed Temperature Rate-Of-Rise Detectors (Spot Type): Designed for surface outlet box mounting and supported independently of conduit, tubing or wiring connections. Contacts shall be self-resetting after response to rate-of-rise actuation. Operation under fixed temperature actuation shall result in an external indication. Detector units located in boiler rooms, showers, or other areas subject to abnormal temperature changes shall operate on fixed temperature principle only.
- E. Open-Area (Spot-Type) Smoke Detectors: Provide detectors designed for detection of abnormal smoke densities by the photoelectric principle. Provide necessary control and power modules required for operation integral with the control panel. Detectors and associated modules shall be compatible with the control panel and shall be suitable for use in a supervised circuit. Malfunction of the electrical circuits to the detector or its control or power units shall result in the operation of the system trouble signals. Each detector shall contain a visible indicator lamp that shall flash when the detector is in the normal standby mode and shall glow continuously when the detector is activated. Each detector shall be the plug-in type with tab-lock or twist-lock, quick disconnect head and separate base in which the detector base contains screw terminals for making all wiring connections. Detector head shall be removable from its base without disconnecting any wires. Removal of detector head from its base shall cause activation of system trouble signals. Each detector shall be screened to prevent the entrance of insects into the detection chamber(s). Provide electronics for communicating with the fire alarm panel.

1. Photoelectric Detectors: Operate on the light scattering principle using a LED light source. Detector shall respond to both flaming and smoldering fires.
 2. Detector Spacing and Location: Detector spacing and location shall be in accordance with the manufacturer's recommendations and the requirements of NFPA 72. Detectors shall not be placed closer than 3 feet from any air discharge or return grille, nor closer than 12 inches to any part of any lighting fixture. In areas without finished ceilings, mount detectors at the underside of deck above unless otherwise indicated.
- F. Notification Appliances: Provide in accordance with NFPA 72 and as indicated. Do not exceed 80 percent of the listed rating in amperes of any notification appliance circuit. Additional circuits above those shown shall be provided if required to meet this requirement. Submit calculations showing compliance with the above power consumption requirements with the calculations required by the paragraph titled "Design Data". Effective sound levels shall comply with NFPA 72. Provide appliances in addition to those shown if required in order to meet NFPA 72 sound level requirements. Finish appliances in red enamel.
1. Alarm Speakers: Recessed, grill, vibrating type suitable for use in an electrically supervised circuit and shall have a sound output rating of at least 90 decibels at 10 feet.
 2. Visible Appliances: Flush-mounted assembly of the stroboscopic type suitable for use in an electrically supervised circuit and powered from the notification appliance circuit(s). Appliances shall provide a minimum of 15candela measured in accordance with UL 1971, but in no case less than the effective intensity required by NFPA 72 for the appliance spacing and location shown. Lamps shall be protected by a thermoplastic lens and labeled "FIRE" in letters at least 1/2 inch high. Provide visible appliances within 12 inches of each audible appliance and as indicated. Visible appliances may be part of an audio-visual assembly. Where more than two appliances are located in the same room or corridor, provide synchronized operation. Mount units at 80" A.F.F. to bottom of device.
- G. Communicating Devices
1. Monitor Modules: Monitor modules shall be individually addressable modules. Modules shall be capable of monitoring a dry contact from an external source such as flow switch, tamper switch, or hood extinguishing system and communicating a change in status of that contact to the control panel. Modules shall be capable of monitoring the status of that contact to the control panel. Modules shall be capable of monitoring the status of the wiring between the module and the monitored contact. An open condition on this wiring shall be reported as a trouble condition.
 2. Control Modules: Control modules shall be individually addressable modules. Modules shall provide dry contact outputs to external devices such as door holders or motor starters to produce an effect as commanded by the control panel.
- H. Fire Alarm Cellular Communicator: A cellular communicator that responds to the actuation of the fire alarm control panel shall be provided. The communicator shall be a UL 864-listed device capable of transmitting alarm, supervisory, and trouble signals via 5G LTE-M or latest cellular technology to a UL-listed central monitoring station. It shall support dual-SIM functionality for redundancy across multiple carriers (e.g., AT&T, Verizon) and include a backup battery providing minimum 24-hour standby power. The communicator shall comply with all aspects of NFPA 72 and UL 864, ensuring supervision intervals not exceeding 60 minutes and secure signal transmission with AES 256-bit encryption or equivalent.

I. Conduit

1. Rigid Steel Conduit (Zinc-Coated): ANSI C80.1 or UL 6.
2. Intermediate Metal Conduit (IMC): UL 1242, zinc-coated steel only.
3. Electrical Metallic Tubing (EMT): ANSI C80.3 or UL 797.

J. Outlet Boxes: UL 514A, zinc-coated steel.

K. Fittings for Conduit and Outlet Boxes: UL 514B, zinc-coated steel.

L. Wiring: NFPA 70 and NFPA 72. Wire for 120V circuits shall be No. 12 AWG minimum solid copper conductor. Insulation shall be 75 degree C minimum with nylon jacket.

2.3 SURGE SUPPRESSION

Provide line voltage and low voltage surge suppression devices to suppress all voltage transients which might damage the control panel and transmitter components. Mount suppressors in separate enclosure(s) adjacent to control panel and transmitter unless suppressors are specifically UL listed or FM approved for mounting inside the control panel and transmitter provided and approved for such use by the control panel and transmitter manufacturers.

- A. Line Voltage Surge Suppressor: Suppressor shall be UL 1449 listed with a maximum 330 volt clamping level and a maximum response time of 5 nanoseconds. Suppressor shall also meet IEEE C62.41 category B tests for surge capacity. Suppressor shall be a multi-stage construction which includes inductors and silicon avalanche Zener diodes. Suppressor shall have a long-life indicating lamp (light emitting diode or neon lamp) which extinguishes upon failure of protection components. Fuses shall be externally accessible. Wire in series with the incoming power source to the protected equipment using screw terminations.
- B. Low Voltage Surge Suppressor: Provide for all circuits which leave the building shell and as shown on the contract drawings. When circuits interconnect two or more buildings, provide an arrestor at the circuit entrance to each building. Suppressor shall be UL 497B listed with a maximum 30 volt clamping level and a maximum response time of 5 nanoseconds. Suppressor shall have multi-stage construction and both differential/common mode protection.

PART 3 - EXECUTION

3.1 INSTALLATION

Installation shall be in accordance with the requirements of NFPA 70, NFPA 72 and the Office of the State Fire Marshal. Each conductor used for the same specific function shall be distinctively color coded. Each function color code shall remain consistent throughout the system. All circuit conductors shall be identified within each enclosure where a tap, splice or termination is made. Conductor identification shall be by plastic coated self sticking printed markers or by heat-shrink type sleeves. The markers shall be attached in a manner that will not permit accidental detachment. Control circuit terminations shall be properly identified. Wire devices so that their removal will activate system trouble signals. Wiring for DC circuits shall not be permitted in the same conduit or tubing as wiring for AC circuits. Paint all junction box covers red or provide them with permanent labels reading "FIRE ALARM CIRCUIT." Electrical metallic tubing shall not be installed in exterior or wet locations and shall not be imbedded in masonry or concrete.

3.2 FIELD QUALITY CONTROL

- A. Preliminary Testing: Notify Design Professional prior to performing preliminary testing. Contractor shall conduct the following tests during installation of wiring and system components. Any deficiency pertaining to these requirements shall be corrected by the Contractor prior to final acceptance testing of the system. Record results of testing.
1. Ground Resistance: Prior to connecting control panel and transmitter, test grounds for ground resistance value. Use a portable ground testing megger to test each ground or group of grounds. Make ground resistance measurements in normally dry weather, not less than 48 hours after a rainfall. Follow the directions provided by the equipment manufacturer for proper use of the equipment. Measure resistance of each connection to ground. Resistance of each connection to ground shall not exceed 5 ohms.
 2. Operation of Entire System. Operate all initiating and indicating devices.
 3. Operation of Supervisory Systems: Operate all portions to demonstrate correctness of installation.
 4. Smoke Detector Test: Clean the smoke detectors in accordance with the manufacturer's recommended procedures. Test smoke detectors using magnet-activated test switch, manufacturer-provided test card, or smoke. Use of aerosol sprays to test smoke detectors is prohibited.
- B. Final Acceptance Testing: The Contractor shall notify the Design Professional when the system is ready for final acceptance testing. Request scheduling for final acceptance testing only after all necessary preliminary tests have been made and all deficiencies found have been corrected to the satisfaction of the equipment manufacturer's technical representative and the Design Professional, and written certification to this effect has been received by the Design Professional. The Contractor shall furnish all appliances, equipment, instruments, devices and personnel for this test. The system shall be tested for approval in the presence of representatives of the manufacturer, and the Design Professional. All necessary tests shall be made including the following, and any deficiency found shall be corrected and the system retested.
1. Entire System: Test the entire system by operating all fire alarm initiating, notification, and signaling devices. Perform tests with the system operating on primary power and repeat the test with the system operating on battery power only. Provide necessary equipment to test smoke detectors and heat detectors.
 2. Supervisory Systems: All aspects of the supervisory functions of the systems shall be operated. Verify proper trouble annunciation at the control panel.
- C. Additional Tests: When deficiencies, defects or malfunctions develop during the tests required, all further testing of the system shall be suspended until proper adjustments, corrections or revisions have been made to assure proper performance of the system. If these revisions require more than a nominal delay, the Design Professional shall be notified when the additional work has been completed, to arrange a new inspection and test of the fire alarm system. All tests required shall be repeated prior to final acceptance, unless directed otherwise.

END OF SECTION 28 31 00

DIVISION 31 - EARTHWORK

SECTION 311100 – CLEARING AND GRUBBING

PART I. - GENERAL

A. RELATED DOCUMENTS

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. SUMMARY

1. This Section includes the following:
 - a. Protection of existing trees indicated to remain.
 - b. Removal of trees and other vegetation.
 - c. Topsoil stripping.
 - d. Clearing and grubbing.

C. PROJECT CONDITIONS

1. Traffic: Conduct site-clearing operations to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities. Do not close or obstruct streets, walks, or other occupied or used facilities without permission from authorities having jurisdiction.
2. Protection of Existing Improvements: Provide protections necessary to prevent damage to existing improvements indicated to remain in place.
 - a. Protect improvements on adjoining properties and on Owner's property.
 - b. Restore damaged improvements to their original condition, as acceptable to property owners.
3. Protection of Existing Trees and Vegetation: Protect existing trees and other vegetation indicated to remain in place against unnecessary cutting, breaking or skinning of roots, skinning or bruising of bark, smothering of trees by stockpiling construction materials or excavated materials within drip line, excess foot or vehicular traffic, or parking of vehicles within drip line. Provide temporary guards to protect trees and vegetation to be left standing.
 - a. Water trees and other vegetation to remain within limits of contract work as required to maintain their health during course of construction operations.
 - b. Provide protection for roots over 1-1/2 inch in diameter that are cut during construction operations. Coat cut faces with an emulsified asphalt or other acceptable coating formulated to use on damaged plant tissues. Temporarily cover exposed roots with wet burlap to prevent roots from drying out; cover with earth as soon as possible.
 - c. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations in a manner acceptable to Architect.

D. EXISTING SERVICES

1. General: Indicated locations are approximate; determine exact locations before commencing Work.
2. Arrange and pay for disconnecting, removing, capping, and plugging utility services. Notify affected utility companies in advance and obtain approval before starting this Work.
3. Place markers to indicate location of disconnected services. Identify service lines and capping locations on Project Record Documents.

PART II. - PRODUCTS (Not Applicable)

PART III. - EXECUTION

A. SITE CLEARING

1. General: Remove trees, shrubs, grass, and other vegetation, improvements, or obstructions, as required, to permit installation of new construction. Remove similar items elsewhere on site or premises as specifically indicated. Removal includes digging out and off-site disposal of stumps and roots.
 - a. Cut minor roots and branches of trees indicated to remain in a clean and careful manner where such roots and branches obstruct installation of new construction.
2. Topsoil: Topsoil is defined as friable clay loam surface soil found in a depth of not less than 4 inches. Satisfactory topsoil is reasonably free of subsoil, clay lumps, stones, and other objects over 2 inches in diameter, and without weeds, roots, and other objectionable material.
 - a. Strip topsoil to whatever depths encountered in a manner to prevent intermingling with underlying subsoil or other objectionable material. Remove heavy growths of grass from areas before stripping.
 - (1) Where existing trees are indicated to remain, leave existing topsoil in place within drip lines to prevent damage to root system.
 - b. Stockpile topsoil in storage piles in areas indicated or directed. Construct storage piles to provide free drainage of surface water. Cover storage piles, if required, to prevent wind erosion.
 - c. Dispose of unsuitable or excess topsoil as specified for disposal of waste material.
3. Clearing and Grubbing: Clear site of trees, shrubs, and other vegetation, except for those indicated to be left standing.
 - a. Completely remove stumps, roots, and other debris protruding through ground surface.
 - b. Use only hand methods for grubbing inside drip line of trees indicated to remain.
 - c. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.
 - (1) Place fill material in horizontal layers not exceeding 6 inches loose depth, and thoroughly compact each layer to a density equal to adjacent original ground.

B. DISPOSAL OF WASTE MATERIALS

1. Burning on Owner's Property: Burning is not permitted on Owner's property.
2. Removal from Owner's Property: Remove waste materials and unsuitable or excess topsoil from Owner's property.

END OF SECTION

DIVISION 31 - EARTHWORK

SECTION 312000 - SITE EARTHWORK

PART I. - GENERAL

A. RELATED DOCUMENTS

1. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division - 1 Specification sections, apply to work of this section.

B. DESCRIPTION OF WORK

1. Clear, proof-roll, excavate, backfill, compact and grade the site to the elevations shown on the Drawings, as specified herein, and as needed to meet the requirements of the construction shown in the Contract Documents.
2. Earthwork for exterior paving is included in this section.
3. Temporary erosion control is included in this section.

C. SOIL REPORT

1. For the information and assistance of the Contractor in anticipating conditions which may be encountered at the site, copies of the soil report may be seen at the office of the Architect.

D. QUALITY ASSURANCE

1. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements of the methods needed for proper performance of the work of this section.
2. Use equipment adequate in size, capacity and numbers to accomplish the work of this section in a timely manner.

E. TESTING AND INSPECTION SERVICES

1. Owner shall retain and pay for the services of a testing laboratory of recognized standing to control all work covered under this section and provide the following services:
2. Verify adherence to specifications for all select fill placed on the site.
3. Observe all fill placement and make the following density determinations per lift:
 - a. Paving Areas, 1 per 2,000 sq.ft. or less of paved area, but in no case fewer than two tests.
4. Each lift shall be tested and accepted prior to placing any more fill.
5. Tests failing to meet specified compaction shall be removed, recompacted and retested at Contractor's expense.

PART II. - PRODUCTS

A. MATERIALS

1. Select Fill Material Within Paved Areas: Sandy clay or silty clay meeting ASTM D 2487 for Group CL material with a maximum liquid limit of 40 and a plasticity index of 15 or less.
2. Granular Fill: Gravel in accordance with ASTM C 33. Gradation may be either size 57 or 67.

PART III. - EXECUTION

A. DRAINAGE

1. Prior to construction, adequate permanent drainage shall be provided to drain surface water away from the construction site during and after construction. Motorized equipment, particularly wheeled equipment shall not be allowed in the foundation area during periods of inclement weather to prevent rutting of the ground surface.
2. Excavations shall be kept dry and, in this regard, should be poured and backfilled as soon as possible after completion of the excavation.

B. TEMPORARY EROSION CONTROL

1. Temporary erosion control shall conform to Section 204 -Temporary Erosion Control, and referenced sections and Sub-sections, of the current edition of the Louisiana Standard Specifications for Roads and Bridges, except where modified by these Specifications.
 - a. All references made therein to methods of measurement and payment are hereby deleted. Payment shall be made under the lump sum bid price for the project.
2. Provide and install temporary erosion control materials as required to protect all new and existing drainage structures from "silting-in" by preventing sediment runoff into drainage structures (protect both above grade gutters and swales, and below grade storm drain piping, manholes, catch basins and junction boxes). The Contractor shall clean out sediment from all drainage structures which becomes deposited during construction.
3. Provide and install temporary erosion control materials as required to mitigate water pollution and sediment runoff onto adjacent property which would cause damage to said property. The Contractor shall preserve the integrity of the project under construction as well as by implementing temporary erosion control measures.
4. Water Pollution: The Contractor shall comply with the applicable provisions of Federal, State, and local law. The Contractor shall protect adjacent waterways from contamination and increased turbidity due to earthwork operations by all means necessary, and limit runoff of stormwater from disturbed areas as necessary to meet the requirements and restrictions of agencies having jurisdiction. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DEVELOPING, SUBMITTING AND IMPLEMENTING THE STORMWATER POLLUTION PREVENTION PLAN (SWPPP). THE CONTRACTOR SHALL PROVIDE AND COMPLETE ALL STEPS IN ORDER FOR THE CONSTRUCTION SITE TO COMPLY WITH THE POLLUTION PREVENTION PLAN REQUIREMENTS CONTAINED IN EPA'S GENERAL PERMITS UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES). The Contractor shall obtain required permits from regulating agencies.
5. Remove and legally dispose of temporary erosion control materials at completion of project. Coordinate removal with the establishment of permanent turf, to ensure no interruption of erosion control protection of site.

C. CLEARING

1. The entire area within paved areas shall be stripped of all grass, brush, vegetation, etc., and all trees, roots, stumps, paving and foundations shall be removed.
2. After removal of the above material, the entire area within paved areas shall be proof-rolled so as to detect any soft spots.
3. All soft spots, including ditches, holes, and low areas shall be dug out and removed as well as all slush, muck or other unsatisfactory material which will decay or produce unsatisfactory subsidence.

D. EXCAVATING

1. All excavations shall be made to the proper depth and correct line, with sufficient allowance for correct forming, shoring, etc. All ditching shall be cut to line, grade and dimensions as required.
2. The sides of excavations shall be maintained secure until permanent support is provided.
3. Excavated areas shall be cleared of all debris, water, slush, muck and soft, unsound, loose or other foreign matter and shall be conditioned to the entire satisfaction of the Architect. If the bottom of the excavation is carried below the elevations called for on the Drawings or is made mucky or unstable due to Contractor's operations or carelessness, he shall, without additional compensation, deepen the excavation to the undisturbed soil and backfill with approved materials to the desired elevation. Backfill shall be compacted to the densities specified hereinafter under BACKFILLING.
4. Contractor shall provide, operate and maintain all necessary pumps, discharge lines, well points, etc., in sufficient number and capacity to keep all excavations, bases, etc., free from seepage, standing or running water at all times throughout the period of construction.
5. Contractor shall assume all responsibility for security of the excavation required, employing bracing, lining, or other accepted means necessary to accomplish same.

E. BACKFILLING

1. Backfilling includes all select fill material necessary to backfill and includes select fill material necessary to bring all areas up to the necessary grades for support of paving slabs.
2. Excavated earth shall not be used for fill under structures or paved areas but may be used for site grading only.
3. All fill supporting sidewalks and paving shall be placed in loose layers not exceeding 8 inches in thickness at moisture contents within 2% below and 4% above its theoretical optimum moisture content, and thoroughly compacted by approved mechanical methods to at least 95% of the density defined by ASTM D-698 (standard Proctor), with the exception of the final 6" at unpaved areas, which shall be compacted to 85% standard proctor density to facilitate root growth.
4. Any lifts failing to meet the compaction requirements shall be removed and re-compacted at Contractor's expense, and re-tested at Owner's expense.

F. SITE GRADING

1. The site shall be generally graded and filled to the grades shown on the Drawings. Fill material shall be spread and thoroughly compacted in loose layers not exceeding 8 inches thick. Excavated soils containing organic material may be used for fill at unpaved areas only.
2. Areas adjacent to buildings and paved areas shall be fine graded from the finished grade at buildings and paved areas to existing or new contour grades at a point 25 feet away unless otherwise shown.
3. Place a minimum of 2 inches approved top soil over areas which are filled or cut by grading.
4. Finished slopes shall be free from irregularities, hollows or depressions. In areas adjacent to buildings, maintain slopes that provide drainage away from the buildings (1% minimum to 20% maximum). Hand fill and grade areas where water stands to eliminate ponding. Repair, fill and regrade any ruts or eroded areas.

END OF SECTION

DIVISION 31 EARTHWORK
SECTION 312310 - EARTHWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Clear, proof-roll, excavate, backfill, compact and grade the site to the elevations shown on the Drawings, as specified herein, and as needed to meet the requirements of the construction shown in the Contract Documents.
 - 2. Earthwork for exterior paving is included in this section.
 - 3. Excavating and backfilling for buildings and structures is included in this section.
 - 4. Drainage and moisture control fill course for slabs on grade is included in this section.
 - 5. Granular fill is included in this section.
 - 6. Excavating and backfilling trenches is included in this section

1.3 SOIL REPORT

- A. For the information and assistance of the Contractor in anticipating conditions which may be encountered at the site, copies of the soil report may be seen at the office of the Architect.

1.4 QUALITY ASSURANCE.

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements of the methods needed for proper performance of the work of this section.
- B. Use equipment adequate in size, capacity and numbers to accomplish the work of this section in a timely manner.

1.5 TESTING AND INSPECTION SERVICES

- A. Owner shall retain and pay for the services of a testing laboratory of recognized

standing to test all work covered under this section and provide the following services:

- B. Verify adherence to specifications for all select fill placed on the site.
- C. Confirm suitability by Atterberg Limit tests at the rate of at least one test per 1,000 cubic yards.
- D. Observe all fill placement and make the following density determinations per lift:
 - 1. Building Areas, 1 per 1,000 sq.ft. or less of building slab, but in no case fewer than two tests.
 - 2. Paving Areas, 1 per 2,000 sq.ft. or less of paved area, but in no case fewer than two tests.
 - 3. Other Areas, 1 per 3,000 sq.ft. or less of fill area, but in no case fewer than two tests.
 - 4. Foundation Wall Backfill: In each compacted backfill layer, perform at least one field in-place density test for each 100 feet or less of wall length, but no fewer than two test along a wall face.
- E. Each lift shall be tested and accepted prior to placing any more fill.
- F. Tests failing to meet specified compaction shall be removed and recompacted at Contractor's expense and retested at Owner's expense.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Select Fill Material Within Building Lines and Paved Areas: Select fill shall consist of homogeneous soils, either a clayey sand (SC) or sandy clay (CL) as defined by Unified Soil Classification System, free of organic matter and debris or rock larger than three (3) inches in diameter, and possessing a plastic index (PI) between 8 and 20, with a liquid limit of 40 or less. The Select Fill shall contain not more than 60% silt (percentage passing a No. 200 mesh sieve). The material shall be placed in accordance with specified requirements for subgrade preparation and verified in accordance with specified testing requirements.
- B. Drainage and moisture control fill course for slabs on grade: Washed flume sand.
- C. Granular Fill: Gravel in accordance with ASTM C 33. Gradation may be either size 57 or 67.

PART 3 - EXECUTION

3.1 DRAINAGE

- A. Prior to construction, adequate permanent drainage shall be provided to drain surface water away from the construction site during and after construction. Motorized equipment, particularly wheeled equipment should not be allowed in the foundation

area during periods of inclement weather to prevent rutting of the ground surface.

- B. Excavations shall be kept dry and, in this regard, should be poured and backfilled as soon as possible after completion of the excavation.

3.2 CLEARING.

- A. The entire area within, and five feet outside of building lines and paved areas shall be stripped of all grass, brush, vegetation, etc., and all trees, roots, stumps, paving and foundations shall be removed.
- B. After removal of the above material, the entire area within building lines and paved areas shall be proof-rolled so as to detect any soft spots.
- C. All soft spots, including ditches, holes, and low areas shall be dug out and removed as well as all slush, muck or other unsatisfactory material which will decay or produce unsatisfactory subsidence.

3.3 EXCAVATING

- A. All excavations shall be made to the proper depth and correct line, with sufficient allowance for correct forming, shoring, etc. All ditching shall be cut to line, grade and dimensions as required.
- B. The sides of excavations shall be maintained secure until permanent support is provided.
- C. Excavated areas shall be cleared of all debris, water, slush, muck and soft, unsound, loose, or other foreign matter and shall be conditioned to the entire satisfaction of the Architect. If the bottom of the excavation is carried below the elevations called for on the Drawings or is made mucky or unstable due to Contractor's operations or carelessness, he shall, without additional compensation, deepen the excavation to the undisturbed soil and backfill with approved materials to the desired elevation. Backfill shall be compacted to the densities specified hereinafter under BACKFILLING.
- D. Contractor shall provide, operate and maintain all necessary pumps, discharge lines, well points, etc., in sufficient number and capacity to keep all excavations, bases, etc., free from seepage, standing or running water at all times throughout the period of construction.
- E. Contractor shall assume all responsibility for security of the excavation required, employing bracing, lining, or other accepted means necessary to accomplish same.

3.4 BACKFILLING: PLACEMENT OF FILL, INCLUDING SELECT FILL (ENGINEERED FILL).

- A. Subgrade preparation: Preparation of the building and site area subgrade shall be done in the following manner:

1. Remove existing pavement, topsoil, soil and waste in a manner acceptable to project owner. Replace with select fill as stated herein.
 2. Scarify exposed subgrade at least eight inches in depth and recompact to density specified below.
 3. Maintain moisture content of existing subgrade soil within 2% below and 4% above its theoretical optimum moisture content.
 4. Compact the existing subgrade to 95% of the density defined by ASTM D-698 (standard proctor) for the native soils.
- B. Backfill excavations promptly, but not before completing the following:
1. Acceptance of construction below finish grade including, where applicable, damp proofing and waterproofing.
 2. Concrete formwork removal.
 3. Removal of trash and debris from excavation.
 4. Removal of temporary shoring and bracing, and sheeting.
- C. Backfilling includes all fill material necessary to backfill against and around all foundations, grade beams, abutments, etc. and includes the select fill material necessary to bring all are-as up to the necessary grades for support of buildings and paving slabs, and site fill as required to grade the site to the elevations shown in the Contract Documents.
- D. Excavated earth shall not be used for fill under structures or paved areas but may be used for site grading only.
- E. Placement and compaction of fill, including select fill:
1. Place fill on tested and accepted compacted subgrade in thin lifts not to exceed eight-inch thickness (loose).
 2. Maintain moisture content of fill soil within 2% below and 4% above its theoretical optimum moisture content.
 3. Compact each lift to at least 95% of the density defined by ASTM D-698 (standard Proctor), with the exception of the final 6" at unpaved areas, which shall be compacted to 85% standard proctor density to facilitate root growth.
- F. Any lifts failing to meet the compaction requirements shall be removed and re-compacted at Contractor's expense and re-tested at Owner's expense.
- 3.5 GRANULAR FILL (DRAINAGE FILL)
- A. After approval of compacted fill, place 4 inches (unless otherwise indicated) of granular fill (drainage fill) as indicated. Granular fill shall be screeded and tamped.
- 3.6 GRADING INSIDE BUILDING LINES
- A. Grading Inside Building Lines: Finish subgrade to a tolerance of 2 inch when tested with a 10-foot straightedge.

3.7 SITE GRADING

- A. The site shall be generally graded and filled to the grades shown on the Drawings. Fill material shall be spread and thoroughly compacted in loose layers not exceeding 8 inches thick. Excavated soils containing organic material may be used for fill at unpaved site areas.
- B. Areas adjacent to buildings and paved areas shall be fine graded from the finished grade at buildings and paved areas to existing or new contour grades at a point 25 feet away unless otherwise shown.
- C. Place a minimum of 2 inches of approved topsoil over areas which are filled or cut by grading.
- D. Finished slopes shall be free from irregularities, hollows or depressions. In areas adjacent to buildings, maintain slopes that provide drainage away from the buildings. Hand fill and grade areas where water stands to eliminate ponding.

END OF SECTION 312310

DIVISION 31 – EARTHWORK

SECTION 312319 - DEWATERING

1.1 GENERAL

- A. The Contractor shall be responsible for installation, operation, fuel, energy, maintenance, and removal of all dewatering and drainage systems installed or constructed to facilitate construction of this project.

1.2 DEWATERING

- A. General: Water encountered during trenching or excavating operations shall be removed or lowered by means of the following dewatering systems for preparation of a satisfactory pipe bed or structural subgrade that is free from water.
- B. Well Points and Pumps: This dewatering system requires the installation of well points and pumps, connecting pipelines and continuous operation in order to permit preparation of a satisfactory pipe bed or structural subgrade.
- C. Pits: Pits with pumps may be used provided that the integrity of soil around the pit is not deteriorated and unacceptable amounts of soil solids are not pumped from the excavation.
- D. Discharge: Water from dewatering operations shall be legally disposed of off-site.
- E. Permits: The contractor shall be responsible for obtaining all permits required for dewatering.

1.3 DRAINAGE

- A. The Contractor shall construct temporary berms or use other means as necessary and appropriate to prevent any surface run-on or run-off from entering any of the excavation. The control of this run-on or run-off shall be such that it does not cause erosion or other damage or unacceptable results to any property or facility.

1.4 REMOVAL OF DEWATERING AND DRAINAGE FACILITIES

- A. The Contractor shall remove all equipment and facilities which he installed or constructed for dewatering or drainage control. He shall restore any area affected by the construction to their original or better condition.

END OF SECTION 312319

DIVISION 31 EARTHWORK

SECTION 312330 TRENCHING, BACKFILLING AND COMPACTING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes excavating, backfilling and grading as required for the construction of the utility systems and appurtenances as shown on the Drawings and as specified herein.
- B. Related Sections: The following Sections contain requirements that relate to this Section.
 - 1. Division 1 Section, "Quality Control"
 - 2. Division 2 Section, "Selective Site Demolition"
 - 3. Division 31 Sections, "Earthwork" and "Site Earthwork"
 - 4. Division 32 Section, "Pavement Base Preparation"
 - 5. Division 32 Section, "Hot Mix Asphalt Pavement"
 - 6. Division 32 Section, "Concrete Paving"
 - 7. Division 22 Section, "Water Distribution System"
 - 8. Division 33 Section, "Storm Sewerage and Drainage"
 - 9. Division 22 Section, "Sanitary Sewer System"
- C. Related Documents:
 - 1. Louisiana Department of Transportation (La DOTD) - Louisiana Standard Specifications for Roads and Bridges (LSSRB) - Latest Edition.

1.2 QUALITY ASSURANCE

- A. General: Coordination and scheduling of materials testing in accordance with the frequencies stated below shall be the responsibility of the Contractor.
- B. When test results indicate, as determined by the Owner's Representative, that construction materials and or placement is not as specified, the material shall be removed, replaced and re-compacted to meet specification requirements, at no additional expense to the Owner. Retests on re-compacted areas shall be performed to determine conformance with specification requirements. Cost of re-testing shall be the responsibility of the Contractor.
- C. Degree of Compaction: Degree of compaction required is expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D 698. This will be abbreviated below as a percent of laboratory maximum density.
- D. Provide all surveying services necessary to establish all vertical and horizontal controls and construction staking required for layout of the work based on Survey monuments indicated in the plans and as specified in the Special Conditions.
- E. Water Pollution: The Contractor shall comply with the applicable provisions of Section 02002 Environmental Protection. The Contractor shall protect adjacent waterways from contamination and increased turbidity due to earthwork operations by all means necessary, and limit runoff of stormwater from disturbed areas as necessary to meet the requirements and restrictions of agencies having jurisdiction.

1.3 SUBMITTALS

- A. General: Submit to the Architect in accordance with Division 1 Section, "Submittals".

1.4 Certifications of source, quality and gradation of materials to be furnished by Contractor for incorporation into the work.

1.5 UNCLASSIFIED EXCAVATION

- A. Excavated material will not be classified as to type. All material encountered shall be removed as required without regard to its physical properties, characteristics or composition. Rock excavation should be anticipated as indicated by boring logs. No changes will be made in the contract sum for rock excavation.

1.6 SAFETY AND PROTECTION

- A. Shoring, sheeting and bracing shall be used as required in trenching operations and shall meet the applicable requirements of OSHA and any other pertinent laws and ordinances regulating health and safety.

1.7 SOIL TESTING

- A. Prior to the placement of any backfill material in the trench, Contractor shall obtain and pay for Standard Proctor Curves as determined by AASHTO Method T-99, or ASTM Designation D 698. Tests shall be performed by a qualified testing laboratory. A Proctor Curve shall be developed for each type of soil to be used for backfill. The frequency and location of compaction testing shall be determined by the testing laboratory. All tests shall be paid for by the Contractor and copies of the test results shall be sent to the Architect. When the results indicate that compaction does not meet Specifications, the material shall be removed and replaced or recompacted as necessary to meet the specified requirements at no additional expense to the Owner. Additional tests shall be performed on recompacted areas to insure compliance with the requirements at the Contractor's expense.

1.8 PROTECTION OF UTILITY LINES

- A. Existing pipelines and underground utility cables or conduits shall be protected from damage during trenching and backfilling operations. Any damage shall be repaired by the Contractor or the utility company at the Contractor's expense.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Satisfactory materials shall be dry native unsegregated on-site soils with less than 5% organic materials, maximum silt quantity of 50% and clumps of soil mass greater than 3-inches. Soils shall be capable drying and compaction by equipment manipulation to meet density requirements. Small quantities of silts and fine sands shall be blended with the prevalent soil to ensure a homogeneous subgrade layer.
- B. Unsatisfactory materials shall be materials that do not comply with the requirements for satisfactory materials. Unsatisfactory materials include but are not limited to silty soils and other soils materials containing roots and other organic matter, trash, debris, soil clumps or stones larger than 3 inches, frozen or wet materials and materials classified in ASTM D 2487, as PT, OH, OL, ML and MH. Unsatisfactory materials also include man-made fills, refuse, or compacted backfills from previous construction.

2.2 SELECT BACKFILL

- A. Material shall be sand conforming to ASTM D 422 Class A-2-4, commonly known as "Red

Dirt" having a maximum Plasticity Index (PI) ranging between 5 to 15 and a maximum Liquid Limit (LL) of 35.

2.3 BEDDING MATERIAL:

- A. When directed by the project representative, Bedding Material shall be Stone or recycled Portland cement concrete conforming to LSSRB, Section 1003.03 or 1003.04 for gravity sewer pipe, sanitary and storm drainage structures.

2.4 CONCRETE

- A. Concrete: Non-reinforced concrete for concrete foundation, embedment, encasement or thrust blocking as called for on the Drawings and shall conform to Section 02515. The designation shown in the plans refers to 28 day compressive strength of the test sample, i.e. 2000 psi..

2.5 PLASTIC MARKING TAPE

- A. Plastic marking tape shall be acid and alkali-resistant polyethylene film, 6-inches wide with minimum thickness of 0.004-inches. Tape shall have a minimum strength of 1750 psi lengthwise and 1500 psi crosswise. The tape shall be manufactured with integral wires, foil backing or other means to enable detection by a metal detector when the tape is buried up to 3 feet deep. The tape shall be of a type specifically manufactured for marking and locating underground utilities. The metallic core of the tape shall be encased in a protective jacket or provided with other means to protect it from corrosion. Tape color shall be as specified in TABLE 1 and shall bear a continuous printed inscription describing the specific utility.

TABLE 1. Tape Color

Red:	Electric
Yellow:	Gas, Oil, Dangerous Materials
Orange:	Telephone, Telegraph, Television, Police, and Fire Communications
Green:	Sewer System Force Mains

2.6 TRACER WIRE:

- A. Tracer wire shall be #10 AWG Type TW standard insulated copper wire and shall be provided in sufficient length to be continuous over each separate run of pressurized nonmetallic pipe, i.e., gas and water lines and sanitary sewer force mains. Wire splices shall be made with 3-M splice kits and coated with mastic.

PART 3 - EXECUTION

3.2 CLEARING

- A. Clear site in the vicinity of construction of new utilities, storm drainage systems and site structures as specified in Section 02110 - Site Clearing.

3.3 STRUCTURAL EXCAVATION FOR SITEWORK

- A. Perform all excavation of every description and of whatever substances encountered, by open cut to the dimensions required for construction and as specified herein.
- B. Maintain walls of the excavation vertical except as indicated otherwise on the Drawings and, if required to protect the safety of workmen, the general public, this or other work or

structures, or excavation walls, properly sheet and brace the excavation. Extend excavations sufficiently to provide a clearance between their outer surfaces and the face of the excavation, sheeting, or bracing, of not less than 2-feet. Support materials encountered in the excavation which have a tendency to slough or flow into the excavation, undermine the banks, weaken the overlying strata, or are otherwise rendered unstable by the excavation operation by sheeting, stabilization, grouting or other approved methods.

- C. When indicated on the details, extend excavations for precast or prefabricated structures below the structure bottom as shown for the bedding material. Prior to placing the bedding, demonstrate to the satisfaction of the Project Representative that the excavation has been carried to the proper depth and is firm and reasonably uniform over the area to be occupied by the structure.

3.4 TRENCH AND STRUCTURAL EXCAVATION

- A. Perform all excavation of every description and of whatever substances encountered, by open cut, to the dimensions and depths shown on the Drawings, or as directed. Carefully support and protect from injury all existing or newly installed utilities such as pipes, poles and structures and in case of damage, restore at no cost to the Owner.
- B. Keep trench excavation walls vertical, to at least 12 inches above top of pipe and, if required to protect the safety of workmen, the general public, this or other work or structures, or to maintain trench widths within the limits hereinafter specified, provide proper sheeting and bracing at no additional cost to the Owner. Provide safety measures in compliance with OSHA requirements and, for trenches 5-feet and deeper, comply with all requirements of OSHA. Where displacement of the utility might occur by removal of the sheeting, cut off the sheeting at a level 2-feet above the top of the installed pipe and leave in place that portion below that level. Excavate no more than 100-feet of trench ahead of pipe laying operations at one time unless a greater length of open trench is approved by the Owner's Representative.
- C. In areas where trench widths and structural excavations are not limited by right-of-way and/or easement widths, property line restrictions, existing adjacent improvements, including pavements, structures and other utilities, and maintenance of traffic, and are not under proposed pavement, the trench sides may be sloped to a stable angle of repose of the excavated material starting at a point 12 inches above the top of pipe. A suitable and safely constructed movable shield, "box" or "mole" may be used in place of sheeting when the trench is opened immediately ahead of the shield and closed immediately behind the shield as pipe laying proceeds inside the shield.
- D. Excavate pipe trenches for utility lines to a width within the limits of 12-inches above the top of the pipe and the trench bottom so as to provide a clearance on each side of the pipe barrel, measured to the face of the excavation or sheeting, if used, of 8-inches. Where the pipe exceeds 12 inches, provide a clearance of 18-inches. Excavate all pipe trenches to grades or depths shown on the Drawings or details.
- E. In excavation of appurtenances, provide a clearance between their outer surfaces and the face of the excavation or sheeting, if used, of not less than 18-inches.
- F. Stockpile satisfactory materials for reuse on the site. Dispose of unsatisfactory materials removed from the trenches at designated sites.
- G. All material removed from the trench and stockpiled, either temporarily or permanently, shall be protected as not to allow excessive erosion or sediment runoff as specified in Section 02120.

3.5 REMOVAL OF WATER

- A. Dewater all excavations containing water and maintain them free from water before and during installation of pipes and structures as required.
- B. Provide all necessary pumps, cofferdams, underdrains, well point systems, and other means for removing water from trenches and other parts of the work. Continue dewatering operations until the backfill has progressed to a sufficient depth over the pipe to prevent flotation or movement of the pipe and is above the natural water table.
- C. Dispose of water from the trenches and excavations in such a manner as will not invalidate any permit conditions or cause injury to public health, to public or private property, to the work completed or in progress, to the surface of the streets, or cause any interference with the use of the same by the public. Before starting the excavation, submit to the Engineer for approval proposed methods of handling trench water and locations at which the water will be disposed of. Obtain all permits required for dewatering operations.

3.6 PIPE AND STRUCTURE BEDDING

- A. After excavating to the proper depths for trenches or new structures, place approved pipe bedding material as indicated on the details for the particular utility system or structure. Tamp, compact and shape the bedding material to provide a firm bed of support under the full length of the pipe including the necessary materials under pipe bells. Pipe joint shall not be supported by the bells. Provide bedding under all branch and service wyes.
- B. Backfill any excess excavations below the levels required for installation of the pipe bedding, with additional bedding, tamped, compacted and shaped to provide proper support for the proposed pipe, at no additional cost to the Owner.
- C. When bedding material is not indicated on the details for the particular utility system such as storm drain pipe, a firm foundation of satisfactory material shall be required. Tamp, compact and shape this material to provide a firm bed of support under the full length of the pipe including the necessary materials under pipe bells. Pipe joint shall not be supported by the bells.

3.7 TRENCH STABILIZATION

- A. Where soft or unstable conditions are encountered in trench bottoms, stabilize such areas so as to provide proper bedding or foundations for the proposed installation by removing the unstable material and replacing with additional bedding material or foundation material as shown on the details, and compact to 90% density as determined by ASTM D698. If in the opinion of the Project Representative replacement of unsuitable material with additional bedding will not provide adequate or permanent stabilization, the unsuitable material shall be removed and replaced with a 5 inch thick non-reinforced concrete foundation (2000 psi). In no event will pipe installation be permitted until such conditions are corrected.

3.8 INITIAL BACKFILL

- A. Backfilling of utility trenches will not be allowed until installation of pipe and appurtenances has been approved. Uncover or expose for inspection at no cost to the Owner any work which is covered or concealed without the knowledge and consent of the Owner's Representative.
- B. Furnish backfill material as specified below:
 - 1. Under Paved areas or within 5 feet of paved areas or structures use Select Backfill.

2. Under unpaved areas not as provided above use satisfactory material.
- C. If a sufficient quantity of Satisfactory material for backfill is not available from the trench or other excavations within the site of the work, provide and install additional material from off-site sources suitable for this purpose at no additional cost.
- D. Place initial backfill material along side the pipe in maximum 8-inch loose lifts and compact each lift to not less than 90 percent of maximum density per ASTM D698 at optimum moisture to plus 4 percent until the depth of cover is 12-inches over the top of the pipe. Exercise particular attention and care in obtaining thorough support for the branch of all service connection fittings and to preserve the alignment and gradient of the installed pipe.

3.9 UTILITY TRACE WIRE AND MARKING TAPE

- A. Install a continuous length of tracer wire for the full length of each run of nonmetallic pressure sewers and water pressure pipe at a depth of 18 inches. Tape wire to top of installed gas pipe. Terminate tracer wire at valve boxes and services as detailed. Splices shall be water tight using a 3-M splice and coating with mastic.
- B. Install correctly colored plastic marking tape over each gas line, sewer force main, and buried electrical line as shown on the details.

3.10 FINAL BACKFILL

- A. After the initial backfill has been placed to a level 12-inches over the pipe and compacted, place the remainder of the backfill in layers not to exceed 8-inches, and compact with mechanical vibrators or other suitable equipment to obtain an in-place density of each lift of the backfill material as specified below:
 1. Under Paved areas or within 5 feet of paved areas or structures: Select granular material compacted to 95 percent of maximum per ASTM D698 at optimum moisture to plus 4 percent, Select Backfill.
 2. Under unpaved areas and beyond 5 feet of paved areas: Satisfactory material compacted to 85 percent of maximum per ASTM D698 at optimum moisture to plus 4 percent.

3.11 FINAL GRADING

- A. Finish grades over completed utilities shall be in accordance with the plans, cross-sections, and typical sections. Areas outside of pavement shall be free of depressions and irregular high spots. Transition final grades to existing grades beyond rights-of-way and easements as required to maintain positive drainage. Seed, fertilize and mulch disturbed in accordance with Section 02932. Contractor repair or correct any settlement of earthwork operations until final acceptance. Repaired sections shall be reseeded. The Contractor shall protect the new work and repair or correct any damage or deterioration at no cost to Owner.

3.12 CLEANING

- A. Keep excavated areas free from debris and stored materials that could damage surfaces or interfere with progress of Work.
- B. Remove excess materials from the Site promptly to prevent large accumulation. Store reusable material neatly in designated locations.
- C. On a daily basis and upon the completion of the Work of this Section, dispose of, away from the Site, debris, trash, containers, residue, remnants and scraps which result from the Work

of this Section. Contractor shall not discard any construction materials such as welding rods, nails, rebar scraps, etc. on the ground. All waste shall be placed in a location for daily pickup.

3.13 ACCEPTANCE TESTING

- A. Allow testing agency to inspect and test subgrades and embankment. Contractor shall not proceed with covering up untested areas until test results for previously completed work verify compliance with requirements.
- B. The Owner will perform testing on in-place work in accordance with Section 01400 - Quality Control. Any area that is deficient or not in compliance with the specifications, whether identified by testing or inspection, shall be corrected by the Contractor as provided above.

END OF SECTION

DIVISION 31 - EARTHWORK

SECTION 312510 - STORM WATER DISCHARGES

PART 1 - GENERAL

1.1 DESCRIPTION

- A. THE CONTRACTOR SHALL PROVIDE AND COMPLETE ALL STEPS IN ORDER FOR THE CONSTRUCTION SITE TO COMPLY WITH THE POLLUTION PREVENTION PLAN REQUIREMENTS CONTAINED IN EPA'S GENERAL PERMITS UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES). The Contractor shall obtain required permits from regulating agencies.
- B. Work indicated on the drawings are minimum requirements and it shall be the Contractor's sole responsibility to provide all work required by EPA, La DEQ, Louisiana Pollutant Discharge Elimination System (LPDES), La DOTD, La DHH, Parish, City, and other authorities having jurisdiction. Installation of temporary erosion control features shall be coordinated with construction of permanent erosion control features to the extent necessary to assure economical, effective and continuous control of erosion and water pollution throughout the life of the contract.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. All materials not covered by project specifications shall be in accordance with DEQ LPDES requirements and La DOTD Standard Specification for Erosion and Pollution Control, and the plans shall be approved before being incorporated into the project. No testing of materials used in temporary erosion control features will be required unless such material is to be incorporated into the completed project.

2.2 SOD AND SEED

- A. Refer to Division 2 Section, "Sodding, Seeding and Fertilizing" for seed and sod.

2.3 SILT FENCING

- A. Silt fencing shall be in accordance with DEQ LPDES requirements and La DOTD Standard Specification for Erosion and Pollution Control.

2.4 HAY BALE FILTERS

- A. Hay bales shall be a minimum of 30 inches in length and weigh a minimum of 50 lbs.
- B. Hay bales shall be bound by either wire or nylon or polypropylene string.
- C. The bales shall be composed entirely of vegetative matter.

PART 3 - EXECUTION

3.1 EXPOSURE OF ERODIBLE EARTH

- A. The Contractor shall limit the surface areas of unprotected erodible earth exposed by clearing and grubbing, excavation or filling operations and shall provide immediate permanent or temporary erosion or pollution control measures to prevent contamination of any stream, lake,

tidal waters, reservoir, canal or other impoundment or prevent detrimental effects of property outside the site and damage to the project. Limitations of areas in which excavation and filing operations may be underway shall be commensurate with the contractor's capability and progress in keeping finish grading and permanent erosion control measures in accordance with the accepted schedule.

3.2 INCORPORATION OF EROSION CONTROL FEATURES

- A. Permanent erosion control features shall be incorporated into the project at the earliest practical time. Use of temporary erosion control features will be authorized to correct unforeseen conditions that develop during construction, to control erosion prior to the time it is practical to construct permanent control features, or to provide immediate temporary control of erosion that develops during normal construction operations but is not associated with permanent erosion control features on the project.

3.3 CONSTRUCTION REQUIREMENTS

- A. The Contractor shall provide soil erosion and sedimentation control measures for the express purpose of preventing soil erosion and/or deposition of sedimentation. The Contractor shall comply with U.S. environmental protection agency regulations under the national pollution discharge elimination system (NPDES).
- B. The Contractor shall use best management practices to minimize air pollution and wind erosion during construction, including, but not limited to, spraying of water on exposed soils, compaction of fill, immediately after grading operations.
- C. Disposal areas, stockpiles, and haul roads shall be constructed in a manner that will minimize and control the amount of sediment that may enter receiving waters. They shall also be situated so as not to obstruct natural drainage.
- D. Any on-site or off-site areas disturbed during construction shall be re-graded, grassed, and restored to pre-construction condition or better.
- E. Temporary erosion control features shall consist of, but not be limited to, temporary seeding, temporary mulching, silt fencing, hay bale filters, sandbagging, slope drains, sediment basins, sediment check dams, erosion checks, artificial coverings and berms.
- F. A baled hay or silt fence installation shall be constructed near the downstream perimeter of the disturbed area along a contour to intercept sediment from overland runoff. A two year storm frequency may be used to calculate the flow rate to be filtered. Baled hay installations shall be sized to filter a maximum flow through rate of 5 GPM/SQ. FT. of cross sectional area, and silt fence installations shall be sized to filter a maximum flow through rate of 100 GPM/FT.
- G. Baled Hay Installation Requirements. Hay bales:
 - 1.) Shall be embedded in the soil a minimum of 4".
 - 2.) Shall be placed in a row with ends tightly abutting the adjacent bales or shall be overlapped.
 - 3.) Shall be placed with bindings parallel to the ground.
 - 4.) Shall be securely anchored in place with 3/8" diameter rebar or 2 x 2 (nominal) wood stakes driven through the bales. The first stake shall be angled toward the previously laid bale to force the bales together.
 - 5.) May be used where the runoff approaching the baled hay flows over disturbed soil for less than 100 feet. If the slope of the disturbed soil exceeds 10%, the length of slope upstream of the baled hay shall be less than 50 feet.
 - 6.) May be used where the installation will be required for less than 3 months.
 - 7.) May be used where the contributing drainage area is less than 1/2 acre.
 - 8.) Shall be replaced every 2 months or more often during wet weather when loss of structural integrity is accelerated.
 - 9.) In small ditches, the ditch side slopes shall be graded as flat as possible to maximize the drainage flow rate through the hay. The ditch shall be graded large enough to contain the overtopping drainage when sediment has filled to the top of the baled hay.

- H. Silt Fence (Sediment Control Fence) Installation Requirements. Silt Fence:
 - 1.) May be used where the contributing drainage area is 2 acres or less.
 - 2.) Shall be constructed of 3'-0" minimum width woven geotextile filter fabric with 5 foot minimum length steel or wood posts spaced at 6 to 8 feet on center. Softwood posts shall be 4" x 4" nominal, and hardwood posts shall be 2" x 2" minimum.
 - 3.) Posts shall lean 2" from vertical in upstream direction.
 - 4.) Joints: Ends of successive sheets or rolls of geotextile fabric shall be lapped and connected with a minimum of six (6) hog rings.
 - 5.) Bottom edge of fabric shall be buried 6" deep with bottom edge turned 2" horizontally in upstream direction in 6" x 6" x continuous trench, and shall be backfilled and hand tamped.
 - 6.) Erosion control around all catch basins shall be $\pm 2'$ wide strip of geotextile filter fabric w/ 2' long steel or wood posts 3' max. o.c. with bottom edge of fabric buried 4" below grade.
 - 7.) Contractor shall remove sediment when deposits reach 1/3 height of silt fence.
- I. Contractor shall protect pipe inlets from sediment-laden stormwater runoff until completion of all construction operations that may contribute sediment to the inlet.
- J. Contractor shall erect and maintain all erosion control devices and protection barriers for the duration of the project. Every seven calendar days, or within 24 hours of a 1/2" rainfall event, the contractor shall inspect existing erosion control devices for effectiveness and shall replace or repair as necessary immediately, including re-grading of topsoil and re-compaction of washed out areas, removing accumulation of silt from any facility after storm events, maintaining all silt fences in an upright and effective position, and temporary and permanent seeding.

END OF SECTION

DIVISION 31 - EARTHWORK
SECTION 313116 - TERMITE CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Soil treatment.
- B. Related Requirements:
 - 1. Section 061000 "Rough Carpentry" for wood preservative treatment by pressure process.

1.3 PREINSTALLATION MEETINGS

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components, and profiles for termite control products.
 - 2. Include the EPA-Registered Label for termiticide products.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Product Certificates: For each type of termite control product.
- C. Soil Treatment Application Report: After application of termiticide is completed, submit report for Owner's records and include the following:
 - 1. Date and time of application.
 - 2. Moisture content of soil before application.
 - 3. Termiticide brand name and manufacturer.
 - 4. Quantity of undiluted termiticide used.
 - 5. Dilutions, methods, volumes used, and rates of application.
 - 6. Areas of application.
 - 7. Water source for application.
- D. Sample Warranties: For special warranties.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A specialist who is licensed according to regulations of authorities having jurisdiction to apply termite control treatment and products in jurisdiction where Project is located and who employs workers trained and approved by manufacturer to install manufacturer's products.

1.7 FIELD CONDITIONS

- A. Soil Treatment:
1. Environmental Limitations: To ensure penetration, do not treat soil that is water saturated or frozen. Do not treat soil while precipitation is occurring. Comply with requirements of the EPA-Registered Label and requirements of authorities having jurisdiction.
 2. Related Work: Coordinate soil treatment application with excavating, filling, grading, and concreting operations. Treat soil under footings, grade beams, and ground-supported slabs before construction.

1.8 WARRANTY

- A. Soil Treatment Special Warranty: Manufacturer's standard form, signed by Applicator and Contractor, certifying that termite control work consisting of applied soil termiticide treatment will prevent infestation of subterranean termites, including Formosan termites (*Coptotermes formosanus*). If subterranean termite activity or damage is discovered during warranty period, re-treat soil and repair or replace damage caused by termite infestation.
1. Warranty Period: Three years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain termite control products from single source.

2.2 SOIL TREATMENT

- A. Termiticide: EPA-Registered termiticide acceptable to authorities having jurisdiction, in an aqueous solution formulated to prevent termite infestation.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. BASF Corporation.
 - b. Bayer Environmental Science.
 - c. Ensystex, Inc.
 - d. Syngenta.
 2. Service Life of Treatment: Soil treatment termiticide that is effective for not less than three years against infestation of subterranean termites.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for moisture content of soil per termiticide label, interfaces with earthwork, slab and foundation work, landscaping, utility installation, and other conditions affecting performance of termite control.
- B. Proceed with application only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Prepare work areas according to the requirements of authorities having jurisdiction and according to manufacturer's written instructions before beginning application and installation of termite control treatment(s). Remove extraneous sources of wood cellulose and other edible materials, such as wood debris, tree stumps and roots, stakes, formwork, and construction waste wood from soil within and around foundations.
- B. Soil Treatment Preparation: Remove foreign matter and impermeable soil materials that could decrease treatment effectiveness on areas to be treated. Loosen, rake, and level soil to be treated, except previously compacted areas under slabs and footings. Termiticides may be applied before placing compacted fill under slabs if recommended in writing by termiticide manufacturer.
 - 1. Fit filling hose connected to water source at the site with a backflow preventer, according to requirements of authorities having jurisdiction.

3.3 APPLYING SOIL TREATMENT

- A. Application: Mix soil treatment termiticide solution to a uniform consistency. Distribute treatment uniformly. Apply treatment at the product's EPA-Registered Label volume and rate for maximum specified concentration of termiticide to the following so that a continuous horizontal and vertical termiticidal barrier or treated zone is established around and under building construction.
 - 1. Slabs-on-Grade and Basement Slabs: Under ground-supported slab construction, including footings, building slabs, and attached slabs as an overall treatment. Treat soil materials before concrete footings and slabs are placed.
 - 2. Foundations: Soil adjacent to and along the entire inside perimeter of foundation walls; along both sides of interior partition walls; around plumbing pipes and electric conduit penetrating the slab; around interior column footers, piers, and chimney bases; and along the entire outside perimeter, from grade to bottom of footing.
 - 3. Penetrations: At expansion joints, control joints, and areas where slabs and below-grade walls will be penetrated.
- B. Post warning signs in areas of application.
- C. Reapply soil treatment solution to areas disturbed by subsequent excavation, grading, landscaping, or other construction activities following application.

3.4 PROTECTION

- A. Avoid disturbance of treated soil after application. Keep off treated areas until completely dry.
- B. Protect termiticide solution dispersed in treated soils and fills from being diluted by exposure to water spillage or weather until ground-supported slabs are installed. Use waterproof barrier according to EPA-Registered Label instructions.

END OF SECTION 313116

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 321100 - PAVEMENT BASE PREPARATION

PART I. GENERAL

A. RELATED DOCUMENTS

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
2. Refer to Division 31 Section - "Site Earthwork" for additional requirements that relate to work of this Section.
3. Concrete paving surface is specified in Division 32 Section - "Concrete Paving".
4. Crushed Stone Paving is specified in Division 32 Section - "Crushed Stone Paving".

B. DESCRIPTION OF WORK

1. This Section includes preparation of base and sub-base for both portland cement concrete paving and crushed stone paving.
2. Extent of paving work is shown on Drawings.

C. SUBMITTALS

1. Material Certificates: Provide copies of materials certificates signed by material producer and Contractor, certifying that each material item complies with, or exceeds, specified requirements.

D. QUALITY ASSURANCE

1. Codes and Standards: Comply with Louisiana Department of Transportation and Development Standard Specifications for Roads and Bridges, latest edition, and with local governing regulations if more stringent than herein specified.

E. TESTING

1. Provide testing and inspection services as specified in Division 31 Section - "Site Earthwork".

F. SITE CONDITIONS

1. Weather Limitations: Base course may be placed when air temperature is above 30 deg.F (-1 deg.C) and rising.
2. Grade Control: Establish and maintain required lines and elevations.

PART II. PRODUCTS

A. MATERIALS

1. General: Use locally available materials and gradations which exhibit a satisfactory record of previous installations and in conformance with LaDOTD Standard Specification for Roads and Bridges Section 302 for a Class II Base Course.
2. Geotextile fabric under crushed stone paving: woven polypropylene geotextile fabric with 200 lbs. minimum Grab Tensile Strength and 90 lbs. minimum Puncture Strength.
 - a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:

- (1) TerraTex GS geotextile fabric as manufactured by WEBTEC, Inc.
 - (2) Mirafi 500X geotextile fabric.
3. Aggregate Surface Course for crushed stone paving: No. 610 crushed limestone), 6" minimum compacted.
 - a. Comply with LaDOTD Standard Specification for Roads and Bridges Section 401 for Aggregate Surface Course.
4. Select Fill: Meet requirements for Select Fill Material Within Paved Areas as specified in Division 31 Section - "Site Earthwork".

PART III. EXECUTION

A. PAVEMENT BASE PREPARATION

1. GENERAL: Typical pavement base shall consist of the following: Compacted select fill over 8 inch minimum scarified and recompacted subgrade.
2. Subgrade (sub-base) preparation: Preparation of the paving area subgrade shall be done in the following manner:
 - a. Remove existing pavement, topsoil, soil and waste, proof roll subgrade, and remove and repair soft spots in conformance with Division 31 Section "Site Earthwork," and replace with select fill as stated therein under requirements for backfilling.
 - b. Prior to backfilling, scarify exposed subgrade at least eight inches (8") in depth and compact to density specified below.
 - (1) Maintain moisture content of existing subgrade soil within 2% below and 4% above its theoretical optimum moisture content.
 - (2) Compact the existing subgrade to 95% of the density defined by ASTM D-698 (standard proctor) for the native soils.
3. Placement and compaction of select fill under paving:
 - a. Place fill on tested and accepted compacted subgrade in thin lifts not to exceed eight inch thickness (loose).
 - b. Maintain moisture content of fill soil within 2% below and 4% above its theoretical optimum moisture content.
 - c. Compact each lift to at least 95% of the density defined by ASTM D-698 (standard Proctor).
 - d. Place compacted select fill sub-base over prepared subgrade at all paved areas.
4. Place a continuous layer of geotextile fabric over compacted select fill sub-base under all crushed stone paving.

B. SURFACE PREPARATION

1. Remove loose material from compacted base surface immediately before applying paving materials.
2. Proof roll prepared base course surface to check for unstable areas and areas requiring additional compaction.
3. Notify Contractor of unsatisfactory conditions. Do not begin paving work until deficient base course and sub-base areas have been corrected and are ready to receive paving.

C. FIELD QUALITY CONTROL

1. General: Owner will engage and pay for the services of a qualified testing laboratory to test in-place base and sub-base courses and subgrade for compliance with requirements for thickness and compaction. Frequency of testing and other testing requirements shall be as specified in Division 31 Section - "Site Earthwork". Contractor shall repair or remove and replace unacceptable materials as directed by Architect.
2. Thickness: In-place compacted thickness will not be acceptable if exceeding following allowable variation from required thickness:
 - a. Base Course: 1/2", plus or minus.
3. Surface Smoothness: Test finished surface of each course for smoothness, using ten foot (10') straightedge applied parallel with, and at right angles to centerline of paved area. Surfaces will not be acceptable if exceeding the following tolerances for smoothness:
 - a. Base Course Surface: 1/4".
4. Check surface areas at intervals as directed by Architect.

END OF SECTION

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 321313 - CONCRETE PAVING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes concrete paving. including the following:
 - 1. Driveways.
 - 2. Roadways.
 - 3. Parking lots.
 - 4. Curbs and gutters.
 - 5. Walks.
- B. Related Requirements:
 - 1. Section 033000 "Cast-in-Place Concrete" for general building applications of concrete.
 - 2. Section 321373 "Concrete Paving Joint Sealants" for joint sealants in expansion and contraction joints within concrete paving and in joints between concrete paving and asphalt paving or adjacent construction.
 - 3. Section 321713 "Parking Bumpers."
 - 4. Section 321723 "Pavement Markings."
 - 5. Section 321726 "Tactile Warning Surfacing" for detectable warning tiles and pavers.

1.2 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash, slag cement, and other pozzolans.
- B. W/C Ratio: The ratio by weight of water to cementitious materials.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Design Mixtures: For each concrete paving mixture. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1.4 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For the following, from manufacturer:
 - 1. Cementitious materials.
 - 2. Steel reinforcement and reinforcement accessories.
 - 3. Admixtures.
 - 4. Curing compounds.
 - 5. Joint fillers.

- B. Field quality-control reports.

1.5 QUALITY ASSURANCE

- A. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.
- B. Testing Agency Qualifications: Qualified according to ASTM C1077 and ASTM E329 for testing indicated.

1.6 PRECONSTRUCTION TESTING

- A. Preconstruction Testing Service: Owner shall engage and pay for the services of a qualified independent testing agency to perform preconstruction testing on concrete paving mixtures.

1.7 FIELD CONDITIONS

- A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.
- B. Cold-Weather Concrete Placement: Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing, or low temperatures. Comply with ACI 306.1 and the following:
 - 1. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.
 - 2. Do not use frozen materials or materials containing ice or snow.
 - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in design mixtures.
- C. Hot-Weather Concrete Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:
 - 1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated in total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 - 2. Cover steel reinforcement with water-soaked burlap, so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
 - 3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

- A. ACI Publications: Comply with ACI 301 unless otherwise indicated.

2.2 FORMS

- A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, and smooth exposed surfaces.
 - 1. Use flexible or uniformly curved forms for curves with a radius of 100 feet or less. Do not use notched and bent forms.
- B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces.

2.3 STEEL REINFORCEMENT

- A. Plain-Steel Welded-Wire Reinforcement: ASTM A1064/A1064M, fabricated from as-drawn steel wire into flat sheets.
- B. Reinforcing Bars: ASTM A615/A615M, Grade 60; deformed.
- C. Steel Bar Mats: ASTM A184/A184M; with ASTM A615/A615M, Grade 60 deformed bars; assembled with clips.
- D. Plain-Steel Wire: ASTM A1064/A1064M, as drawn.
- E. Joint Dowel Bars: ASTM A615/A615M, Grade 60 plain-steel bars. Cut bars true to length with ends square and free of burrs.
- F. Tie Bars: ASTM A615/A615M, Grade 60; deformed.
- G. Hook Bolts: ASTM A307, Grade A, internally and externally threaded. Design hook-bolt joint assembly to hold coupling against paving form and in position during concreting operations, and to permit removal without damage to concrete or hook bolt.
- H. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded-wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete specified, and as follows:
 - 1. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.
- I. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating, compatible with epoxy coating on reinforcement.
- J. Zinc Repair Material: ASTM A780/A780M.

2.4 CONCRETE MATERIALS

- A. Cementitious Materials: Use the following cementitious materials, of same type, brand, and source throughout Project:
 - 1. Portland Cement: ASTM C150/C150M, gray portland cement Type I.
 - 2. Fly Ash: ASTM C618, Class C or Class F.

- B. Normal-Weight Aggregates: ASTM C33/C33M, Class 4M, uniformly graded. Provide aggregates from a single source.
 - 1. Maximum Coarse-Aggregate Size: 1-1/2 inches nominal.
 - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Air-Entraining Admixture: ASTM C260/C260M.
- D. Chemical Admixtures: Admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.
 - 1. Water-Reducing Admixture: ASTM C494/C494M, Type A.
- E. Water: Potable and complying with ASTM C94/C94M.

2.5 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular, film forming, manufactured for application to fresh concrete.
- B. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C309, Type 1, Class B, dissipating.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Anti-Hydro International, Inc
 - b. ChemMasters, Inc
 - c. Dayton Superior Corporation
 - d. Euclid Chemical Company (The); a subsidiary of RPM International, Inc.
 - e. Kaufman Products, Inc
 - f. Lambert Corporation
 - g. Laticrete International, Inc.
 - h. Nox-Crete Products Group
 - i. Right Pointe
 - j. SpecChem, LLC
 - k. TK Products Construction Coatings, a Fenix Group SPC Company
 - l. Unitex; a Brand of Dayton Superior Corporation
 - m. Vexcon Chemicals Inc.
 - n. W. R. Meadows, Inc

2.6 RELATED MATERIALS

- A. Joint Fillers: ASTM D1751, asphalt-saturated cellulosic fiber in preformed strips.
- B. Slip-Resistive Aggregate Finish: Factory-graded, packaged, rustproof, nonglazing, abrasive aggregate of fused aluminum-oxide granules or crushed emery aggregate containing not less than 50 percent aluminum oxide and not less than 20 percent ferric oxide; unaffected by freezing, moisture, and cleaning materials.
- C. Bonding Agent: ASTM C1059/C1059M, Type II, non-redispersible, acrylic emulsion or styrene

butadiene.

1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

2.7 CONCRETE MIXTURES

- A. Prepare design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete, and as determined by either laboratory trial mixtures or field experience.
 1. Owner will engage and pay for the services of a qualified independent testing agency to perform preconstruction testing of proposed concrete design mixtures.
 2. When automatic machine placement is used, determine design mixtures and obtain laboratory test results that comply with or exceed requirements.
- B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
 1. Fly Ash or Pozzolan: 20 percent.
- C. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content as follows:
 1. Air Content, 1-1/2-inch Nominal Maximum Aggregate Size: 5.5 percent plus or minus 1-1/2 percent.
- D. Limit water-soluble, chloride-ion content in hardened concrete to 0.1 percent by weight of cement.
- E. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.
 1. Use water-reducing admixture in concrete as required for placement and workability.
 2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
- F. Concrete Mixtures: Normal-weight concrete.
 1. Concrete for driveways and parking areas: Compressive Strength (28 Days): 4000 psi.
 2. Concrete for sidewalks, drainage structures, etc.: Compressive Strength (28 Days): 3000 psi.
 3. Maximum W/C Ratio at Point of Placement: 0.50.
 4. Slump Limit: 3 inches minimum to 5 inches maximum.
 - a. Slump limit for concrete containing high-range water-reducing admixture (superplasticizer): Not more than 8 inches after adding admixture to site-verified 2-to-3-inch slump concrete.
 5. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, project conditions, weather, test results, or other circumstances warrant.

2.8 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C94/C94M. Furnish batch certificates for each batch discharged and used in the Work.
 - 1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.
- B. Proof-roll prepared subbase surface below concrete paving to identify soft pockets and areas of excess yielding.
 - 1. Completely proof-roll subbase in one direction and repeat in perpendicular direction. Limit vehicle speed to 3 mph.
 - 2. Proof-roll with a pneumatic-tired and loaded, 10-wheel, tandem-axle dump truck weighing not less than 15 tons.
 - 3. Correct subbase with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch according to requirements in Section 312000 "Earth Moving."
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

- A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.
- B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 INSTALLATION OF STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.
- C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.

- D. Install welded-wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

3.5 JOINTS

- A. General: Form construction, isolation, and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated.
 - 1. When joining existing paving, place transverse joints to align with previously placed joints unless otherwise indicated.
- B. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half hour unless paving terminates at isolation joints.
 - 1. Continue steel reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of paving strips unless otherwise indicated.
 - 2. Provide tie bars at sides of paving strips where indicated.
 - 3. Keyed Joints: Provide preformed keyway-section forms or bulkhead forms with keys unless otherwise indicated. Embed keys at least 1-1/2 inches into concrete.
 - 4. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.
- C. Expansion Joints (E.J.) / Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed objects, and where indicated.
 - 1. Locate 3/4" wide expansion joints at intervals of 60 feet maximum each way in roads, driveways and parking areas, unless otherwise indicated.
 - 2. Locate 3/4" wide isolation joints where paving abuts buildings, catch basins, light pole bases and other structures, along property lines, and where roads and driveways meet parking areas.
 - 3. Extend joint fillers full width and depth of joint.
 - 4. Terminate joint filler not less than 1/2 inch or more than 1 inch below finished surface if joint sealant is indicated.
 - 5. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
 - 6. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
 - 7. During concrete placement, protect top edge of joint filler with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.
 - 8. Secure joint fillers and dowels to resist movement by wet concrete.
 - 9. Locate expansion joints at intervals of 15 feet maximum o.c. in all concrete curbs and curb/gutters. Align expansion joints in curbs with expansion and control joints in drives.
 - 10. Locate 1/2" wide expansion joints at intervals of 30 feet maximum each way in sidewalks, patios, and other areas of 4" thick paving, unless indicated otherwise.
- D. Contraction Joints (Control Joints, C.J.): Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Unless otherwise indicated, locate control joints for roads, driveways and parking areas halfway between expansion joints to limit the maximum concrete panel size to 15 feet x 15 feet. Construct contraction joints for a depth equal to at least one-

fourth of the concrete thickness, as follows:

1. Sawed Joints for roads, drives and parking: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.
 2. Or Keyed Joints for roads, drives and parking: Contraction joints (control joints) formed with galvanized steel keyed joint equal to "Form-A-Key" "Key-Loc" joint system with removable plastic cap to form void for sealant.
 3. Doweled Contraction Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.
 4. Provide equally spaced scored control joints for sidewalks, patios, and other areas of 4" thick paving, at 5'-0" maximum o.c. each way, or as indicated on drawings.
- E. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a [1/4-inch] radius. Repeat tooling of edges after applying surface finishes. Eliminate edging-tool marks on concrete surfaces.

3.6 CONCRETE PLACEMENT

- A. Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast-in.
- B. Remove snow, ice, or frost from subbase surface and steel reinforcement before placing concrete. Do not place concrete on frozen surfaces.
- C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.
- D. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.
- E. Do not add water to concrete during delivery or at Project site. Do not add water to fresh concrete after testing.
- F. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.
- G. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.
 1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement, dowels and joint devices.
- H. Screed paving surface with a straightedge and strike off.
- I. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleedwater appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.
- J. Curbs and Gutters: Use design mixture for automatic machine placement. Produce curbs and

gutters to required cross section, lines, grades, finish, and jointing.

- K. Slip-Form Paving: Use design mixture for automatic machine placement. Produce paving to required thickness, lines, grades, finish, and jointing.
 - 1. Compact subbase and prepare subgrade of sufficient width to prevent displacement of slip-form paving machine during operations.

3.7 FLOAT FINISHING

- A. General: Do not add water to concrete surfaces during finishing operations.
- B. Float Finish: Begin the second floating operation when bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.
 - 1. Medium-to-Fine-Textured Broom Finish: Draw a soft-bristle broom across float-finished concrete surface, perpendicular to line of traffic, to provide a uniform, fine-line texture.

3.8 INSTALLATION OF DETECTABLE WARNINGS

- A. Blockouts: Form blockouts in concrete for installation of detectable paving units specified in Section 321726 "Tactile Warning Surfacing."
 - 1. Tolerance for Opening Size: Plus 1/4 inch, no minus.

3.9 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. Comply with ACI 306.1 for cold-weather protection.
- C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete but before float finishing.
- D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- E. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound or a combination of these as follows:
 - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
 - a. Water.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated and kept continuously wet. Cover concrete

surfaces and edges with 12-inch lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Immediately repair any holes or tears occurring during installation or curing period, using cover material and waterproof tape.
3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating, and repair damage during curing period.

3.10 PAVING TOLERANCES

A. Comply with tolerances in ACI 117 and as follows:

1. Elevation: 3/4 inch.
2. Thickness: Plus 3/8 inch, minus 1/4 inch.
3. Surface: Gap below 10-feet- long; unlevelled straightedge not to exceed 1/2 inch.
4. Alignment of Tie-Bar End Relative to Line Perpendicular to Paving Edge: 1/2 inch per 12 inches of tie bar.
5. Lateral Alignment and Spacing of Dowels: 1 inch.
6. Vertical Alignment of Dowels: 1/4 inch.
7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Paving Edge: 1/4 inch per 12 inches of dowel.
8. Joint Spacing: 3 inches.
9. Contraction Joint Depth: Plus 1/4 inch, no minus.
10. Joint Width: Plus 1/8 inch, no minus.

3.11 FIELD QUALITY CONTROL

A. Testing Agency: Owner shall engage and pay for the services of a qualified testing agency to perform tests and inspections.

B. Testing Services: Testing and inspecting of composite samples of fresh concrete obtained according to ASTM C172/C172M will be performed according to the following requirements:

1. Testing Frequency: Obtain at least one composite sample for each day's pour of each concrete class exceeding 5 cu. yd. but less than 25 cu. yd., plus one set for each additional 50 cu. yd.
 - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing to be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
2. Slump: ASTM C143/C143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C231/C231M, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C1064/C1064M; one test hourly when air temperature is 40 deg F and below and when it is 80 deg F and above, and one test for each composite sample.
5. Compression Test Specimens: ASTM C31/C31M; cast and laboratory cure one set of

- four standard cylinder specimens for each composite sample.
6. Compressive-Strength Tests: ASTM C39/C39M; test one specimen at seven days and two specimens at 28 days and retain one specimen in reserve for later testing if required.
- a. A compressive-strength test to be the average compressive strength from two specimens obtained from same composite sample and tested at 28 days.
- C. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
- D. Strength of each concrete mixture will be satisfactory if average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength, and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
- E. Test results to be reported in writing to Architect, Owner, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests to contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
- F. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
- G. Additional Tests: Testing and inspecting agency will make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.
- H. Concrete paving will be considered defective if it does not pass tests and inspections.
- I. Additional testing and inspecting, at Owner's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- 3.12 REPAIR AND PROTECTION
- A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Architect.
- B. Drill test cores, where directed by Architect, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory paving areas with portland cement concrete bonded to paving with epoxy adhesive.
- C. Protect concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.
- D. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.

3.13 SCHEDULES

- A. Concrete Sidewalks and Patios: 20.7 MPa (3,000 psi) 28-day concrete, 100 mm (4 inches) thick. Reinforced with 6 x 6, W1.4 x W1.4 welded wire mesh.
- B. Roads, Drives and Parking Area Pavement: 27.6 MPa (4,000 psi) 28-day concrete, 125 mm (5 inches) thick or 152 mm, 6" where indicated on plans, with 6 x 6, W2.9 x W2.9 inch mesh reinforcement.
- C. Mechanical and Electrical Equipment Support Pads: 27.6 MPa (3,000 psi) 28-day concrete, minimum 125 mm (5 inches) thick or 152 mm, 6" where indicated on plans, with 6 x 6, W2.9 x W2.9 inch mesh reinforcement.

END OF SECTION 321313

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 321373 - PAVEMENT JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Cold-applied joint sealants.
2. Joint-sealant backer materials.
3. Primers.

B. Related Requirements:

1. Section 079200 "Joint Sealants" for sealing nontraffic and traffic joints in locations not specified in this Section.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Concrete pavement joint sealants.
2. Joint-sealant backer materials.

B. Samples for Initial Selection: Manufacturer's standard color sheets, showing full range of available colors for each type of joint sealant.

1.3 INFORMATIONAL SUBMITTALS

1.4 QUALITY ASSURANCE

A. Qualifications:

1. Installers: An experienced installer who has specialized in installing joint sealants similar in material, design, and extent to those indicated for this Project and whose work has resulted in joint sealant installations with a record of successful in-service performance..

1.5 FIELD CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Obtain joint sealants from single manufacturer for each sealant type.

2.2 JOINT SEALANTS, GENERAL

- A. Compatibility: Provide joint sealants, backer materials, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

2.3 COLD-APPLIED JOINT SEALANTS

- A. Single-Component, Nonsag, Silicone Joint Sealant: ASTM D5893/D5893M, Type NS.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Crafcro Inc.; RoadSaver Silicone.
 - b. Pecora Corporation; 301 NS.
 - c. The Dow Chemical Company; Dow Corning 888 Silicone Joint Sealant.
- B. Single-Component, Self-Leveling, Silicone Joint Sealant: ASTM D5893/D5893M, Type SL.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Crafcro Inc.; RoadSaver Silicone SL.
 - b. Pecora Corporation; 300 SL.
 - c. The Dow Chemical Company; Dow Corning 890-SL Silicone Joint Sealant.

2.4 JOINT-SEALANT BACKER MATERIALS

- A. Joint-Sealant Backer Materials: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by joint-sealant manufacturer, based on field experience and laboratory testing.
- B. Round Backer Rods for Cold- and Hot-Applied Joint Sealants: ASTM D5249, Type 1, of diameter and density required to control sealant depth and prevent bottom-side adhesion of sealant.
- C. Round Backer Rods for Cold-Applied Joint Sealants: ASTM D5249, Type 3, of diameter and density required to control joint-sealant depth and prevent bottom-side adhesion of sealant.
- D. Backer Strips for Cold- and Hot-Applied Joint Sealants: ASTM D5249; Type 2; of thickness and width required to control joint-sealant depth, prevent bottom-side adhesion of sealant, and fill remainder of joint opening under sealant.

2.5 PRIMERS

- A. Primers: Product recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Before installing joint sealants, clean out joints immediately to comply with joint-sealant manufacturer's written instructions.
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
- B. Joint Priming: Prime joint substrates where indicated or where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

3.3 INSTALLATION OF JOINT SEALANTS

- A. Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated unless more stringent requirements apply.
- B. Joint-Sealant Installation Standard: Comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions.
- C. Install joint-sealant backers to support joint sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of joint-sealant backer materials.
 - 2. Do not stretch, twist, puncture, or tear joint-sealant backer materials.
 - 3. Remove absorbent joint-sealant backer materials that have become wet before sealant application and replace them with dry materials.
- D. Install joint sealants immediately following backer material installation, using proven techniques that comply with the following:
 - 1. Place joint sealants so they fully contact joint substrates.
 - 2. Completely fill recesses in each joint configuration.

3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- E. Tooling of Nonsag Joint Sealants: Immediately after joint-sealant application and before skinning or curing begins, tool sealants in accordance with the following requirements to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint:
 1. Remove excess joint sealant from surfaces adjacent to joints.
 2. Use tooling agents that are approved in writing by joint-sealant manufacturer and that do not discolor sealants or adjacent surfaces.
- F. Provide joint configuration to comply with joint-sealant manufacturer's written instructions unless otherwise indicated.

3.4 CLEANING AND PROTECTION

- A. Clean off excess joint sealant as the Work progresses, by methods and with cleaning materials approved in writing by joint-sealant manufacturers.
- B. Protect joint sealants, during and after curing period, from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately and replace with joint sealant so installations in repaired areas are indistinguishable from the original work.

3.5 PAVING-JOINT-SEALANT SCHEDULE

- A. Joints within concrete paving:
 1. Joint Location:
 - a. Expansion and isolation joints in concrete paving.
 - b. Contraction joints in concrete paving.
 - c. Other joints as indicated.
 2. Joint Sealant: Single-component, nonsag, silicone joint sealant.
 3. Joint-Sealant Color: Manufacturer's standard.
- B. Joints within concrete paving and between concrete and asphalt paving:
 1. Joint Location:
 - a. Joints between concrete and asphalt paving.
 - b. Joints between concrete curbs and asphalt paving.
 - c. Other joints as indicated.
 2. Joint Sealant: Hot-applied, single-component joint sealant.
 3. Joint-Sealant Color: Manufacturer's standard.

END OF SECTION 321373

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 321540 – CRUSHED STONE PAVING

PART I. GENERAL

A. RELATED DOCUMENTS

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
2. Refer to Division 31 Section - "Site Earthwork" for additional requirements that relate to work of this Section.
3. Concrete paving and curbs are specified in Division 32 Section - "Concrete Paving".

B. DESCRIPTION OF WORK

1. This Section includes crushed stone surfacing and geotextile fabric and preparation of base and sub-base for crushed stone paving.
2. Extent of paving and surfacing work is shown on Drawings.

C. SUBMITTALS

1. Material Certificates: Provide copies of materials certificates signed by material producer and Contractor, certifying that each material item complies with, or exceeds, specified requirements.

D. QUALITY ASSURANCE

1. Codes and Standards: Comply with Louisiana Department of Transportation and Development Standard Specifications for Roads and Bridges, latest edition, and with local governing regulations if more stringent than herein specified.

E. TESTING

1. Provide testing and inspection services as specified in Division 31 Section - "Site Earthwork".

F. SITE CONDITIONS

1. Weather Limitations: Base course may be placed when air temperature is above 30 deg.F (-1 deg.C) and rising.
2. Grade Control: Establish and maintain required lines and elevations.

PART II. PRODUCTS

A. MATERIALS

1. General: Use locally available materials and gradations which exhibit a satisfactory record of previous installations and in conformance with LaDOTD Standard Specification for Roads and Bridges Section 401 for Aggregate Surface Course.
2. Geotextile fabric: woven polypropylene geotextile fabric with 200 lbs. minimum Grab Tensile Strength and 90 lbs. minimum Puncture Strength.
 - a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
 - (1) TerraTex GS geotextile fabric as manufactured by WEBTEC, Inc.

- (2) Mirafi 500X geotextile fabric.
3. Aggregate Surface Course: Crushed limestone, 4" minimum compacted thickness.
 - a. Comply with LaDOTD Standard Specification for Roads and Bridges Section 401 for Aggregate Surface Course.
 - b. Provide #610 crushed limestone.
 - c. Aggregate material shall be a dense-graded crushed limestone gravel mixed with crushed limestone of size range from $\frac{3}{4}$ inch to powder.
 - d. Material shall be placed over geotextile fabric and compacted to 95% standard proctor.
4. Select Fill: Meet requirements for Select Fill Material Within Paved Areas as specified in Division 31 Section - "Site Earthwork".

PART III. EXECUTION

A. PAVEMENT BASE PREPARATION

1. GENERAL: Typical crushed limestone paving shall consist of the following: 6 inch minimum thickness compacted crushed limestone aggregate surface coarse, over geotextile fabric, over compacted select fill, over 8 inch minimum scarified and recompacted subgrade.
2. Subgrade (sub-base) preparation: Preparation of the paving area subgrade shall be done in the following manner:
 - a. Remove existing pavement, topsoil, soil and waste, proof roll subgrade, and remove and repair soft spots in conformance with Division 2 Section "Site Earthwork," and replace with select fill as stated therein under requirements for backfilling.
 - b. Prior to backfilling, scarify exposed subgrade at least eight inches (8") in depth and recompact to density specified below.
 - (1) Maintain moisture content of existing subgrade soil within 2% below and 4% above its theoretical optimum moisture content.
 - (2) Compact the existing subgrade to 95% of the density defined by ASTM D-698 (standard proctor) for the native soils.
3. Placement and compaction of select fill under paving:
 - a. Place fill on tested and accepted compacted subgrade in thin lifts not to exceed eight inch thickness (loose).
 - b. Maintain moisture content of fill soil within 2% below and 4% above its theoretical optimum moisture content.
 - c. Compact each lift to at least 95% of the density defined by ASTM D-698 (standard Proctor).
 - d. Place a compacted select fill over prepared subgrade at all paved areas.
4. Place a continuous layer of geotextile fabric over compacted select fill sub-base under all paved areas.
5. Place a minimum four inch (4") thick layer of compacted crushed limestone aggregate surface course over geotextile fabric at all areas indicated to receive crushed limestone paving. Compact crushed limestone surface course to 95% standard proctor.

B. SURFACE PREPARATION

1. Proof roll prepared sub-base surface to check for unstable areas and areas requiring additional compaction.
2. Do not begin aggregate surfacing work until deficient sub-base areas have been corrected and are ready to receive aggregate surfacing.

3. Remove loose material from compacted surface.

C. FIELD QUALITY CONTROL

2. Thickness: In-place compacted thickness will not be acceptable if exceeding following allowable variation from required thickness:
 - a. Aggregate Surface Course: 1/2", plus or minus.
3. Surface Smoothness: Test finished surface of each course for smoothness, using ten foot (10') straightedge applied parallel with, and at right angles to centerline of paved area. Surfaces will not be acceptable if exceeding the following tolerances for smoothness:
 - a. Aggregate Surface Course: 1/4".
4. Check surface areas at intervals as directed by Architect.

END OF SECTION

DIVISION 32 - EXTERIOR IMPROVEMENTS

SECTION 323113 - CHAIN LINK FENCING AND GATES

PART I. - GENERAL

A. RELATED DOCUMENTS:

1. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

B. DESCRIPTION OF WORK:

1. This Section includes the following:
 - a. Galvanized steel chain link fence and gates.
2. Extent of chain link fences and gates is indicated on drawings.

C. REFERENCES:

1. ASTM A 123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
2. ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
3. ASTM F 567 - Standard Practice for Installation of Chain-Link Fence.
4. CLFMI Product Manual; Chain Link Fence Manufacturers Institute.

D. QUALITY ASSURANCE:

1. Single-Source Responsibility: Obtain chain link fences and gates as complete units, including necessary erection accessories, fittings, and fastenings from a single source or manufacturer.
2. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

E. SUBMITTALS:

1. Product data in the form of manufacturer's technical data, specifications, and installation instructions for fence and gate posts, fabric, gates, and accessories.
2. Shop drawings: Indicate plan layout, showing location of fence, gates, each post, and details of post installation, post foundation dimensions, extension arms, gate swing, hardware, hardware anchorage, accessories, spacing of components, and schedule of components.

PART II. - PRODUCTS

A. GENERAL:

1. Materials and Components: Conform to CLFMI Product Manual.
2. Dimensions indicated are outside dimensions, exclusive of coatings.

B. STEEL FABRIC:

1. Fabric for fencing up to 12' high: No. 9 ga. (0.148" 0.005") size steel wires, 2" mesh. For fencing 6' and higher: provide knuckeled bottom selvage and twisted top selvage; Under 6' high: provide knuckeled bottom selvage and knuckeled top selvage.
 - a. Furnish one piece fabric widths for fencing up to 12' high.
2. Fabric Finish: Zinc-Coated Fabric: Zinc-coated steel wire. Galvanized steel chain link fabric. Galvanized, ASTM A 392, Class II, with not less than 2.0 oz. zinc per sq. ft. of surface.

C. FRAMING AND ACCESSORIES:

1. Steel Framework, General: Galvanized steel , ASTM A 120 or A 123, with not less than 1.8 oz. zinc per sq. ft. of surface.
2. Fittings and Accessories: Galvanized, ASTM A 153, with zinc weights per Table 1. .
3. End, Corner and Pull Posts: Minimum sizes and weights as follows:
 - a. Up to 6' fabric height, 2.375" OD steel pipe, 3.65 lbs. per lin. ft., or 3.5" x 3.5" roll-formed sections, 4.85 lbs. per lin. ft.
 - b. Over 6' fabric height, 2.875-inch OD Type I or II steel pipe, 2.50-inch square steel tubing weighing 5.10 lbs. per lin. ft., or 3.5-inch by 3.5-inch roll-formed sections weighing 4.85 lbs. per lin. ft.
4. Line Posts: Space 10' o.c. maximum, unless otherwise indicated, of following minimum sizes and weights.
 - a. Up to 6' fabric height, 1.90" OD steel pipe, 2.70 lbs. per lin. ft. or 1.875" x 1.625" C-sections, 2.28 lbs. per lin. ft.
 - b. Over 6' fabric height, 2.375-inch OD Type I or II steel pipe, 2.25-inch by 1.70-inch C section weighing 2.70 lbs. per lin. ft., or 2.25-inch by 1.70-inch galvanized steel H section weighing 3.26 lb. per lin. ft.
5. Gate Posts: Furnish posts for supporting single gate leaf, or each leaf of a double gate installation, for nominal gate widths as follows:

Leaf Width	Gate Post	lbs./lin. ft.
up to 6'-0"	3" x 3" x 11 ga. galv. steel tube or 2.875" OD pipe	4.7 5.79

6. Top Rail: Manufacturer's longest lengths, with expansion type couplings, approximately 6" long, for each joint. Provide means for attaching top rail securely to each gate corner, pull and end post.
 - a. 1.66" OD pipe, 2.27 lbs. per ft. or 1.625" x 1.25" roll-formed sections, 1.35 lbs. per ft.
7. Post Tops: Provide weathertight closure cap with loop to receive toprail; one cap for each post.
8. Stretcher Bars: One-piece lengths equal to full height of fabric, with minimum cross-section of 3/16" x 3/4". Provide one stretcher bar for each gate and end post, and 2 for each corner and pull post, except where fabric is integrally woven into post.
9. Stretcher Bar Bands: Space not over 15" o.c., to secure stretcher bars to end, corner, pull, and gate posts.

D. GATES:

1. Fabrication: Fabricate perimeter frames of gates from metal and finish to match fence framework. Assemble gate frames by welding or with special fittings and rivets for rigid connections, providing security against removal or breakage of connections. Provide horizontal and vertical members to ensure proper gate operation and attachment of fabric, hardware and accessories.
 - a. Provide same fabric as for fence. Install fabric with stretcher bars at vertical edges and at top and bottom edges. Attach stretcher bars to gate frame at not more than 15" o.c.
 - b. Install diagonal cross-bracing consisting of 3/8" diameter adjustable length truss rods on gates to ensure frame rigidity without sag or twist.
 - c. Where barbed wire is indicated above gates, extend end members of gate frames 1'-0" above top member and prepare to receive 3 strands of wire. Provide necessary clips for securing wire to extensions.
2. Swing Gates: Fabricate perimeter frames of minimum 1.90" OD pipe.

3. Gate Hardware: Provide hardware and accessories for each gate, galvanized per ASTM A 153, and in accordance with the following:
 - a. Hinges: Size and material to suit gate size, non-lift-off type, offset to permit 180° gate opening. Provide 1-1/2 pair of hinges for each leaf.
 - b. Latch: Forked type or plunger-bar type to permit operation from either side of gate, with padlock eye as integral part of latch. .
 - c. Gate Stops: Provide gate stops for double gates consisting of mushroom-type flush plate with anchors, set in concrete, and designed to engage a center drop rod or plunger bar. Include a locking device and padlock eyes as an integral part of the latch, permitting both gate leaves to be locked with a single padlock.
 - c. All sliding Gates shall have electric operators with master keyed cylinder lock. Gate number 25 shall have keypad access control at entry point.
4. Cantilevered Sliding Gates: 6' High x 19' Wide Automated Gate Kit Components: Each sliding gate shall have the following:
 - a. 1 - 6' High Chain Link Cantilever Slide Gate
 - b. 2 - 6-5/8" O.D. x 10' Long Galvanized HF40 Gate Posts
 - c. 1 - 4" O.D. x 10' Long Galvanized HF40 Latch Post
 - d. 2 - 6-5/8" Post Caps
 - e. 1 - 4" Post Cap
 - f. 4 - 6-5/8" x 2-1/2" Nylon Cantilever Rollers
 - g. 2 - Top Fit Safety Cantilever Roller Covers
 - h. 2 - Bottom Fit Safety Cantilever Roller Covers
 - i. 1 - Galvanized Slide Gate Latch - Fits 4" Latch Post
 - j. 1 - Linear HSLG-111 Slide Gate Operator, 1HP, 115VAC
 - k. 2 - Monitored Photo Eye Sensor, UL325 Compliant
 - l. 2 - Reflector Posts w/ Caps
 - m. 2 - Operator Mounting Posts w/ Caps
 - n. 1 – Transmitter
 - o. 1 or 2 masterkeyed cylinders as required.
 - p. Gate number 25 shall have keypad access control at entry point.
 - q. Cantilever gate frames shall consist of 2-1/2" O.D. horizontal rails, 2" O.D. vertical bracing, and 1-5/8" diagonal bracing; all components shall be welded and galvanized. Chain link shall be 9ga. 2" mesh, 1.2 oz. zinc galvanized after weaving. Gates shall be fully stretched, including counterbalance.
 - r. The slide gate counterbalance shall be approximately 1/2 the length of the gate opening. On gates with automatic operator, provide counterbalance length as required to allow the operator to 'pull' the gate shut by the rear of the counterbalance.
 - s. Post sizes for up-to-6' high steel chain link cantilever slide gates: Provide 3" O.D. roller posts for opening widths up to 10'. Provide 4" O.D. posts for up to 20' opening width and 6-5/8" O.D. posts for up to 32' opening width.
 - t. Concrete footings: 18" diameter x 42" deep for 3"-4" posts (for gates up to 20' wide) and 24" diameter x 42" deep for 6-5/8" O.D. posts (for gates up to 32' wide). Increase bottom diameters 6", creating a bell-shaped hole. Call 811 prior to excavating post hole footings.

5. Concrete: Provide concrete consisting of portland cement, ASTM C 150, aggregates ASTM C 33, and clean water. Mix materials to obtain concrete with a minimum 28-day compressive strength of 2500 psi using at least 4 sacks of cement per cu. yd., 1" maximum size aggregate, maximum 3" slump, and 2% to 4% entrained air.

PART III. - EXECUTION

A. INSTALLATION:

1. Do not begin installation and erection before final grading is completed, unless otherwise permitted.
2. Excavation: Drill or hand excavate (using post hole digger) holes for posts to diameters and spacings indicated, in firm, undisturbed or compacted soil
 - a. Excavate holes for each post to minimum diameter recommended by fence manufacturer, but not less than 4 times largest cross-section of post.
 - b. Excavate hole depths approximately 3" lower than post bottom, with bottom of posts set not less than 36" below finish grade surface.
3. Setting Posts: Center and align posts in holes 3" above bottom of excavation.
 - a. Place concrete around posts and vibrate or tamp for consolidation. Check each post for vertical and top alignment, and hold in position during placement and finishing operations.
 - b. Extend concrete footings 2" above grade and trowel to a crown to shed water.
4. Top Rails: Run rail continuously through post caps, bending to radius for curved runs. Provide expansion couplings as recommended by fencing manufacturer.
5. Fabric: Leave approximately 2" between finish grade and bottom selvage. Pull fabric taut and tie to posts, rails, and tension wires. Install fabric on security side of fence, and anchor to framework so that fabric remains in tension after pulling force is released.
6. Stretcher Bars: Thread through or clamp to fabric 4" o.c. , and secure to posts with metal bands spaced 15" o.c.
7. Gates: Install gates plumb, level, and secure for full opening without interference. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubricate where necessary.
8. Tie Wires: Use U-shaped wire, conforming to diameter of pipe to which attached-, clasping pipe and fabric firmly with ends twisted at least 2 full turns. Bend ends of wire to minimize hazard to persons or clothing.
 - a. Tie fabric to line posts, with wire ties spaced 12" o.c. Tie fabric to rails and braces, with wire ties spaced 24" o.c.
9. Fasteners: Install nuts for tension bands and hardware bolts on side of fence opposite fabric side. Peen ends of bolts or score threads to prevent removal of nuts.

END OF SECTION

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 329200 – TURF AND GRASSES

PART 1 - GENERAL

1.1 DESCRIPTION

This work consists of furnishing and installing all planting materials required for sodding, seeding and fertilizing hereinafter specified in locations as shown. In general, the Work shall include, but not limited to the following:

- A. Preparing, transportation and placing of topsoil for planting. Provide and install 2" thick topsoil at all unpaved site areas disturbed by construction, including the 6 foot strip under the sod and the hydromulched areas.
- B. Replacing of dying and unsatisfactory plant material.
- C. Fine grading, dressing, seeding, fertilizing and mulching ("turf"), of all unpaved areas disturbed by construction, including playing fields, berms, embankments, planting areas and lawn areas (except omit hydromulching where where sod is indicated).
- D. Provide a six (6) foot wide by continuous border of St. Augustine (or Celebration Bermudagrass) sod all around all new buildings, and new covered porches and walkways (extending 6 ft. out from building line). All remaining unpaved site areas disturbed by construction shall receive hydromulching, seeding and fertilizing.

1.2 EQUIPMENT

Maintain all equipment, tools and machinery while on the project in sufficient quantities and capacity for proper execution of the work.

1.3 SUBMITTALS

- A. Certificates of Conformance or Compliance: Before delivery, notarized certificates attesting that the following materials meet the requirements specified shall be submitted to the Architect for approval:
 - 1. Fertilizers
 - 2. Seed
 - 3. Mulch and tackifier (Contractor shall also submit samples of each type of mulch)

1.4 DELIVERY AND STORAGE

- A. Delivery:
 - 1. Deliver fertilizer to the site in the original, unopened containers bearing the manufacturer's guaranteed chemical analysis, name, trade name or trademark, and in conformance to state and federal law. In lieu of containers, fertilizer may be furnished in bulk and a certificate indicating the above information shall accompany each delivery.
 - 2. During delivery: Protect seed from contamination.
- B. Storage:
 - 1. Keep seed and fertilizer in dry storage away from contaminants.

1.5 TURF ESTABLISHMENT PERIOD

- A. The Establishment Period for turf shall begin immediately after installation, with the approval of the Architect, and continue until the date that the Architect performs a final inspection. During the Turf Establishment Period the Contractor shall:
 - 1. Water all turf to maintain an adequate supply of moisture within the root zone. An adequate supply of moisture is the equivalent of 25 mm (1 inch) of absorbed water per week either through natural rainfall or augmented by periodic watering. Apply water at a moderate rate so as not to flood the turf.
 - 2. Provide the following turf establishment:
 - 3. Eradicate all weeds. Water, fertilize, over seed, and perform any other operation necessary to promote the growth of grass.
 - 4. Replant areas void of turf 0.1 m² (one square foot) and larger in area.
 - 5. The Contractor is not responsible for theft or damage to lawns by non-contractor vehicles or vandalism once lawns are installed and approved.

1.6 TURF GUARANTEE

All work shall be in accordance with the terms of the Paragraph, "Guaranty" of Section GENERAL CONDITIONS, including the following supplements:

- A. A One Year Turf Guarantee will begin on the date that the Architect performs the final inspection. The Contractor shall have completed and installed all trees according to the plans and specifications at grades indicated by final inspection. All voided areas of turf or dead or dying turf shall be replaced. Eroded areas shall be re-graded and new fill and or top soil added to bring up to grade elevations as indicated on drawings. The one year guarantee will begin when all areas are complete and turf is expected to be living and in a healthy condition at time of final inspection. (Note: The term "turf" applies to new sodded and seeded areas)
- B. The Contractor will replace within the Warranty Period any areas void of turf immediately including all eroded fill and or top soil upon written notice by owner. Immediately means within two weeks of written notice from owner.
- C. The Architect will re-inspect all turf at the end of the One Year Guarantee. The Contractor shall replace any dead, missing, or defective turf immediately. If necessary, eroded areas with void of turf, the Contractor is to fill in all ruts, re-grade to elevations indicated on drawings, and install new turf with specified erosion control to cover these void areas. The Guarantee will end on the date of re-inspection, provided the Contractor has complied with the work required by this specification and have completed all remedial work noted during at the one year inspection.

1.7 APPLICABLE PUBLICATIONS

- A. The publications listed below, form a part of this specification to the extent referenced. The publications are referenced in the text by basic designation only.
- B. American Society For Testing And Materials (ASTM) Publications:
- C. C136 / C136M Sieve Analysis of Fine and Coarse Aggregates
- D. Turf Producers International:
- E. Guideline Specifications to Turfgrass Sodding, latest edition.
- F. U. S. Department of Agriculture Federal Seed Act of August 9, 1939

PART 2 - PRODUCTS

2.1 GENERAL

All turf material will conform to the varieties specified or shown in the plant list and be true to botanical name as listed in Hortus Third.

2.2 TOPSOIL

- A. Topsoil shall be a well-graded soil of good uniform quality. It shall be a natural, friable soil representative of productive soils in the vicinity. Topsoil shall be free of admixture of subsoil, foreign matter, objects larger than 25 mm (one inch) in any dimension, toxic substances, weeds and any material or substances that may be harmful to plant growth and shall have a pH value of not less than 5.0 nor more than 7.5.
- B. The Contractor shall furnish topsoil. At least 10 days prior to topsoil delivery, notify the Architect of the source(s) from which topsoil is to be furnished. Obtain topsoil from well drained areas. Additional topsoil shall meet the general requirements as stated above and comply with the requirements specified in Section, TESTING. Amend topsoil not meeting the pH range specified by the addition of pH adjusters.

2.3 TURF FERTILIZER

Provide turf fertilizer that is commercial grade, free flowing, uniform in composition, and conforms to applicable state and federal regulations. Granular fertilizer shall bear the manufacturer's guaranteed statement of analysis. Granular fertilizer shall contain a minimum percentage by weight of 8 nitrogen (of which 50 percent shall be organic), 8 available phosphoric acid, and 8 potash. Liquid starter fertilizer for use in the hydro seed slurry will be commercial type with 50 percent of the nitrogen in slow release form.

2.4 WATER

Clean, potable water.

2.5 SEED

Seed shall be state-certified seed of the latest season's crop and shall be delivered in original sealed packages bearing the producer's guaranteed analysis for percentages of mixtures, purity, germination, weed seed content, and inert material. Seed shall be labeled in conformance with U. S. Department of Agriculture rules and regulations under the Federal Seed Act and applicable state seed laws. Seed that has become wet, moldy, or otherwise damaged will not be acceptable. Onsite seed mixing shall be done only in the presence of the Architect. Seed mixtures shall be proportioned by weight as follows:

MARCH THROUGH SEPTEMBER:

NAME OF GRASS

(Botanical and Common) weight per area

Centipede (*Eremochloa Ophiuroides*) 1 pound per 1000 square feet.

Yukon Bermuda Grass (*Cynodon dactylon*) 5 pounds per 1000 square feet.

Percent Germination Maximum Percent Weed Seed

85% .04

OCTOBER THROUGH FEBRUARY:

NAME OF GRASS

(Botanical and Common) weight per area

Hulled Yukon Bermuda Grass Seed (*Cynodon dactylon*) 15 pounds per acre.

Unhulled Yukon Bermuda Grass Seed (*Cynodon dactylon*) 15 pounds per acre

Winter grass (Fescue) 20 pounds per acre.

Dwarf Perennial Rye Grass 60 pounds per acre.

Percent Germination Maximum Percent Weed Seed

85% .04

2.6 MULCH

- A. Mulch for flat and low slope areas (less than 25% slope) shall consist of 100% wood fiber mulch equal to: "Mat Fiber Plus" Wood Fiber Mulch by "Mat, Inc." of Floodwood, Minnesota with 3% "Stik-Plus" tackifier plus an additional 30 to 40 lbs. per acre of "Stik-Plus" tackifier.
- B. Mulch for berms, embankments, and steep slopes 1 in 4 (25%) and steeper shall consist of 100% wood fiber mulch equal to: "Soil Guard" Bonded Fiber Matrix by "Mat, Inc." of Floodwood, Minnesota.
- C. Asphalt shall not be used for mulching.
- D. Paper products such as recycled newsprint shall not be used for mulching.

2.7 HERBICIDES

All herbicides shall be properly labeled and registered with the U. S. Department of Agriculture. Keep all herbicides in the original labeled containers indicating the analysis and method of use.

2.8 SOD

Strongly rooted St. Augustine sod, not less than three years old, from an off-site source (or nursery grown "Celebration Bermudagrass" sod) shall be free of weeds, undesirable plants, large stone and other materials detrimental to development and maintenance of lawn. Sod shall be considered free of weeds if less than 5 objectionable grassy and broad leaf weeds are found per 100 square feet. Sod shall be grown in good loamy soil; heavy clay is unacceptable.

PART 3 - EXECUTION

3.1 PLANTING AND TURF INSTALLATION SEASONS AND CONDITIONS

No work shall be done when the ground is frozen, snow covered, too wet or in an otherwise unsuitable condition for planting.

3.2 RESTORATION AND CLEAN-UP

Remove excess and waste material daily. In areas where turf work has been completed, clear the area of all debris, spoil piles, and containers. Where existing or new turf areas have been damaged or scarred during planting and construction operations, restore disturbed area to their original condition. Keep at least one paved pedestrian access route and one paved vehicular access route to each building clean at all times. Clear all other paved areas when work in adjacent areas is completed.

3.3 MAINTENANCE

Maintenance operations shall begin immediately after each area of turf is planted and continue as required. Keep turf in a healthy, growing condition by watering and any other necessary operation of maintenance. Inspect turf once per week during the Turf Establishment Period and perform needed maintenance promptly.

3.4 TILLAGE

After the areas required to be turf have been brought to the grades as specified, if the areas are less than a 3:1 slope ratio, thoroughly till to a depth of at least 100 mm (4 inches) by scarifying, disking, harrowing, or other approved methods. Remove all debris and stones larger than one inch remaining on the surface after tillage. To minimize erosion, do not till areas of 3:1 slope ratio or greater. Scarify these areas to a one inch depth and remove debris.

3.5 FINISH GRADING

Prior to placing topsoil, scarify the subgrade to a 50 mm (2 inch) depth for bonding of topsoil with subsoil. Spread the topsoil evenly to a minimum depth of 2 inches. Do not spread topsoil when frozen or excessively wet or dry. Correct irregularities in finished surfaces to eliminate depressions. Protect finished topsoil areas from damage by vehicular or pedestrian traffic. Complete lawn work only after areas are brought to finished grade.

3.6 APPLICATION OF FERTILIZER AND LIME FOR TURF AREAS

- A. Immediately before any turf work, restore the soil to an even condition.
- B. Apply turf fertilizer at the rate of 12.5 pounds per 1,000 square feet. In addition, adjust soil acidity and add soil conditioners as required herein for suitable topsoil under PART 2, Paragraph, TOPSOIL.
- C. Incorporate fertilizers into the slurry to be hydraulically spray-applied as part of the mulching and seeding operation specified.

3.7 MECHANICAL SEEDING

- A. Broadcast seed by approved equipment at the specified rate.
- B. Where seed is applied in combination with hydro-mulching, no rolling is required.
- C. Apply seed, fertilizer and mulch simultaneously in a hydraulic spray application. Take precautionary measures to prevent materials and/or equipment from marking or defacing structures, pavements, utilities, or plantings.

3.8 Mulching:

- A. **MULCH:** 100% wood fiber mulch shall be blended with the specified seed, fertilizer and water into a homogeneous slurry and spray applied with hydraulic planting equipment.
- B. **SPREADING RATES:** Mulch shall be applied simultaneously with the specified seed and fertilizer at a rate as recommended by the manufacturer and as required to produce a continuous and strong moisture-holding mat capable of holding soil, seed and fertilizer in place for rapid seed germination and growth.
- C. **GENERAL REQUIREMENTS:** Mulching shall be simultaneous with seeding and fertilizing. Mulch shall be placed with equipment which will distribute homogeneous slurry of mulch, seed, fertilizer and water uniformly by spraying it onto the area. Damage to seeded and mulched areas shall be repaired and re-seeded and re-mulched at no cost to owner.
- D. **MULCHING OPERATIONS:** Mulching shall begin from the top of slopes and work downward. The Contractor shall make adjustments, during windy conditions, in operations to obtain uniform spreading. Mulch shall not be sprayed on building structures.

3.9 SODDING PROCEDURES

- A. Sod shall not be laid unless soil is friable to a depth of three (3) inches.
- B. Fertilizer shall be a complete commercial lawn starter fertilizer, 18-24-10 grade. Spread uniformly over sodded area and water in to prevent burning.
- C. Finished grade shall be raked smooth, free from depressions or undulations, to the satisfaction of the Architect.
- D. The soil surface shall be moistened immediately before sod-laying with a fine spray which will not cause disturbance of the finished surface.
- E. Sod pieces shall be fitted tightly together so that no joint is visible and be firmly and evenly tamped by hand.
- F. After sodding is completed and has been approved, it shall be rolled with a hand roller weighing between 150 and 200 pounds.
- G. All sodded areas shall be watered immediately after final rolling and fertilization with a fine spray to a depth of four (4) inches.
- H. All sod shall be pegged on slopes 3:1 or greater.

3.10 WATERING

Apply water to the turf areas immediately following installation at a rate sufficient to ensure thorough wetting of the soil to a depth of at least 100 mm (4 inches). Supervise watering operation to prevent run-off. Supply all pumps, hoses, pipelines, and sprinkling equipment. Repair all areas damaged by water operations.

3.11 PROTECTION OF TURF AREAS

Immediately after installation of the turf areas, protect against traffic or other use by erecting barricades, as required, and placing approved signs at appropriate intervals until final acceptance.

3.12 ENVIRONMENTAL PROTECTION

All work and Contractor operations shall comply with the regulations of governing authorities.

3.13 FINAL CLEAN-UP

Remove all debris, rubbish and excess material from the site and legally dispose. Keep all pavement clean and work area orderly as work progresses.

END OF SECTION